US005779075A

United States Patent [19]

Salmon et al.

[11] Patent Number: 5,779,075

[45] Date of Patent: Jul. 14, 1998

[54] **SCREW CAP AND A TAMPER-PROOFING RING, PACKAGING PROVIDED WITH SUCH A CAP, A METHOD OF MANUFACTURING SUCH A CAP, AND A METHOD OF MANUFACTURING SUCH PACKAGING**

[75] Inventors: **Pierre Salmon**, Chatillon-D'Azergues; **Jean-Patrice Racine**, Saint Andre-De-Crocy, both of France

[73] Assignee: **Novembal**, Paris, France

[21] Appl. No.: **605,018**

[22] PCT Filed: **Jul. 29, 1994**

[86] PCT No.: **PCT/FR94/00965**

§ 371 Date: **Mar. 27, 1996**

§ 102(e) Date: **Mar. 27, 1996**

[87] PCT Pub. No.: **WO95/06598**

PCT Pub. Date: **Mar. 9, 1995**

[30] **Foreign Application Priority Data**

Sep. 3, 1993 [FR] France 93/10542
Nov. 5, 1993 [FR] France 93/13180

[51] **Int. Cl.**[6] **B65D 41/34**

[52] **U.S. Cl.** **215/252**

[58] **Field of Search** 215/252

[56] **References Cited**

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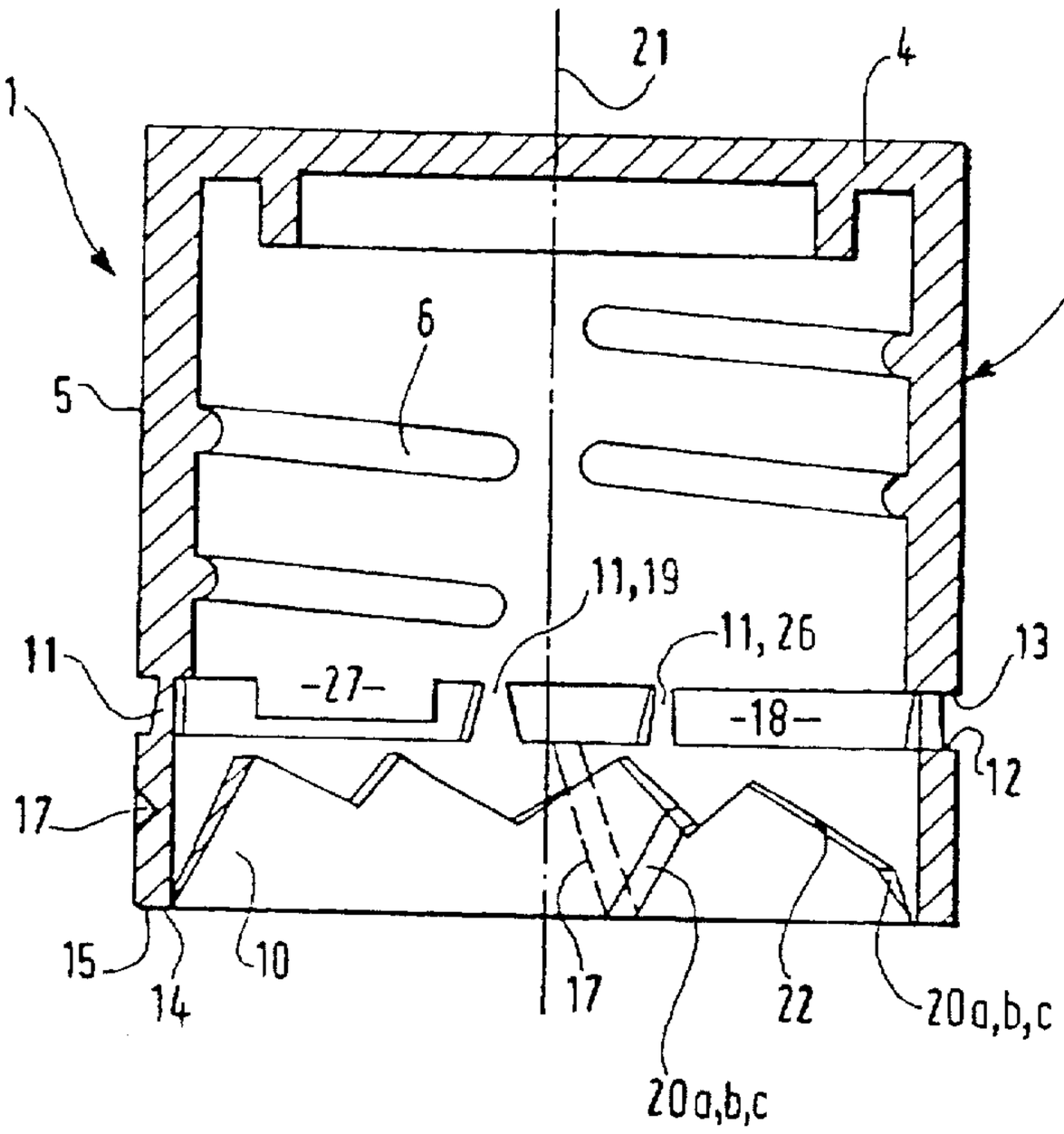
Primary Examiner—Stephen Cronin
Attorney, Agent, or Firm—Young & Thompson

[57] **ABSTRACT**

The invention relates to a screw cap made of a plastics material, the cap comprising a closing portion (**3**); optional sealing means (**7**) mounted in or integral with the closing portion (**3**); and a tamper-proofing ring (**8**) made in one piece with the closing portion (**3**). According to the invention, the cap comprises a breakable zone (**17**) of the outer portion (**9**) enabling it to be opened on unscrewing the cap (**1**) leads firstly to an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and secondly to a breakable zone (**20***a*), to a cut (**20***b*), or to a gap (**20***c*) in the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains associated with the closing portion (**3**).

34 Claims, 9 Drawing Sheets



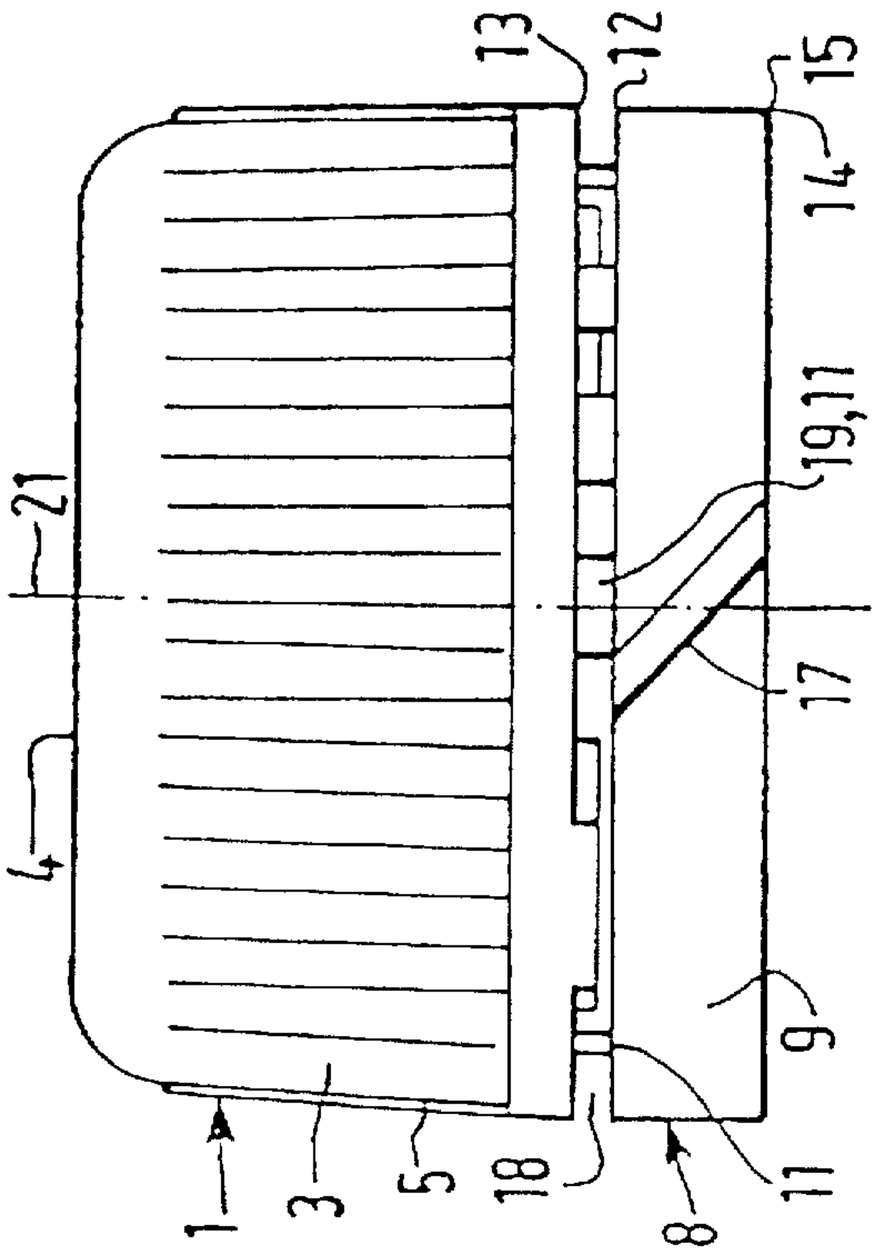


FIG.2

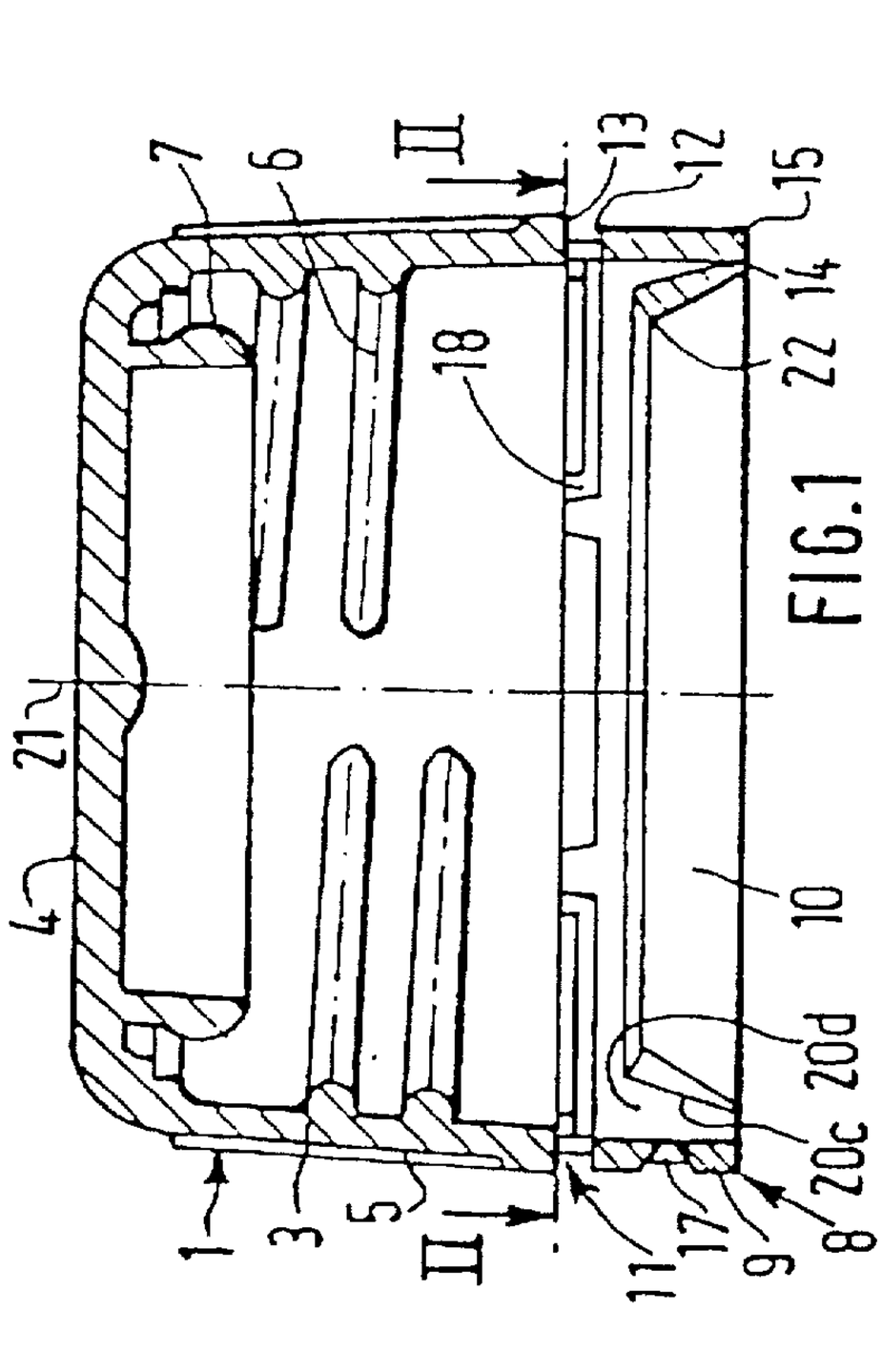


FIG.1

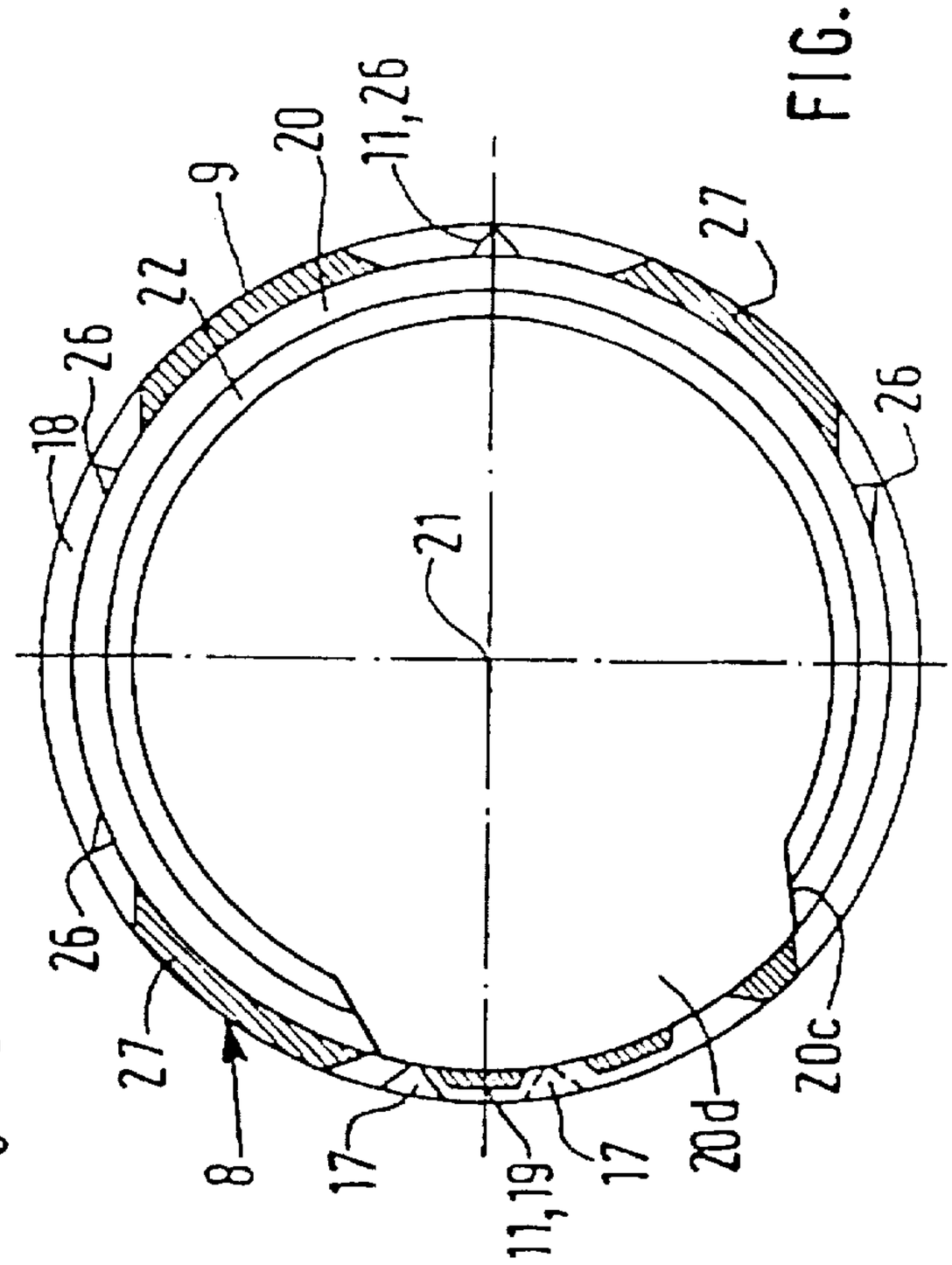


FIG.3

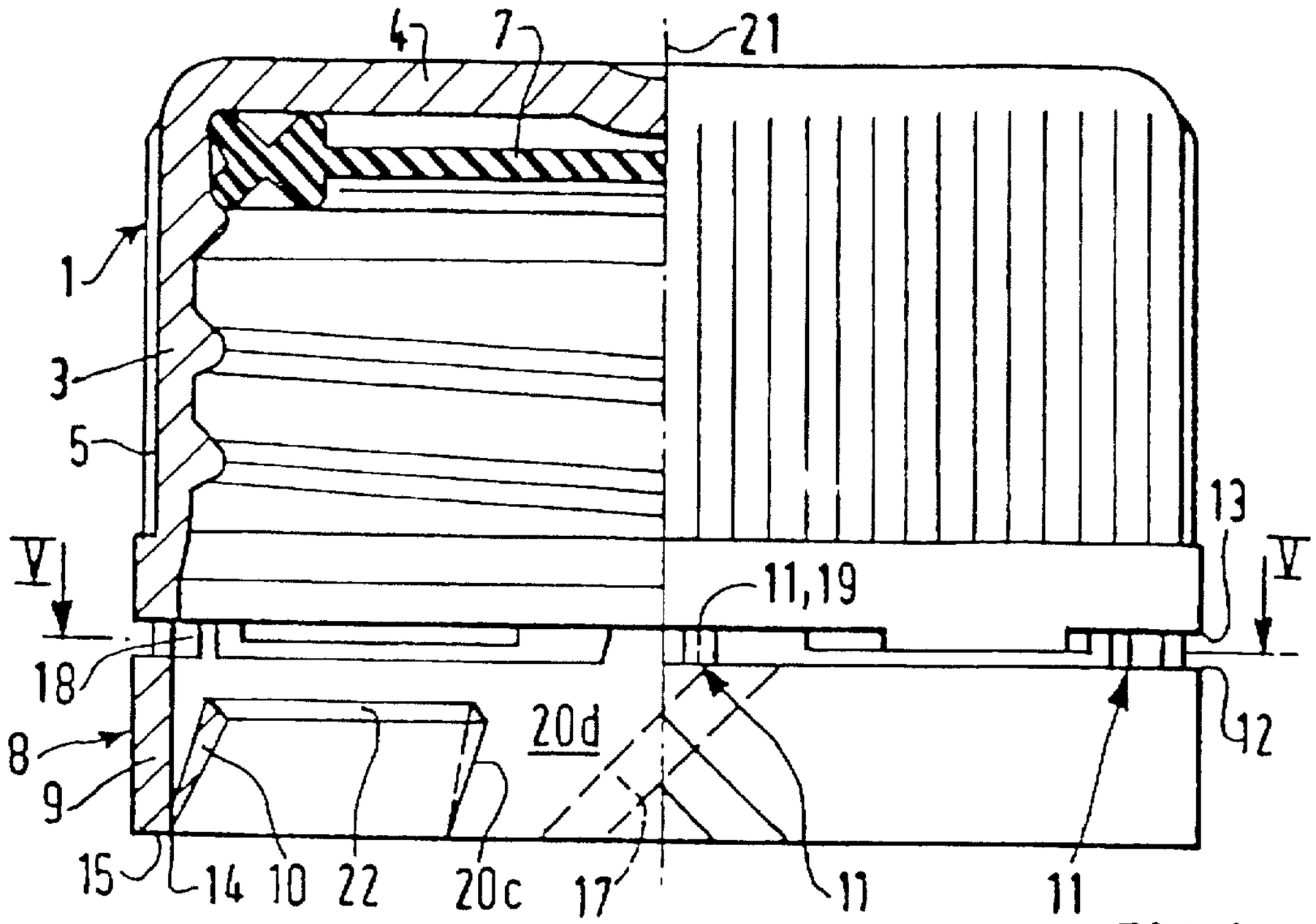

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FIG.4

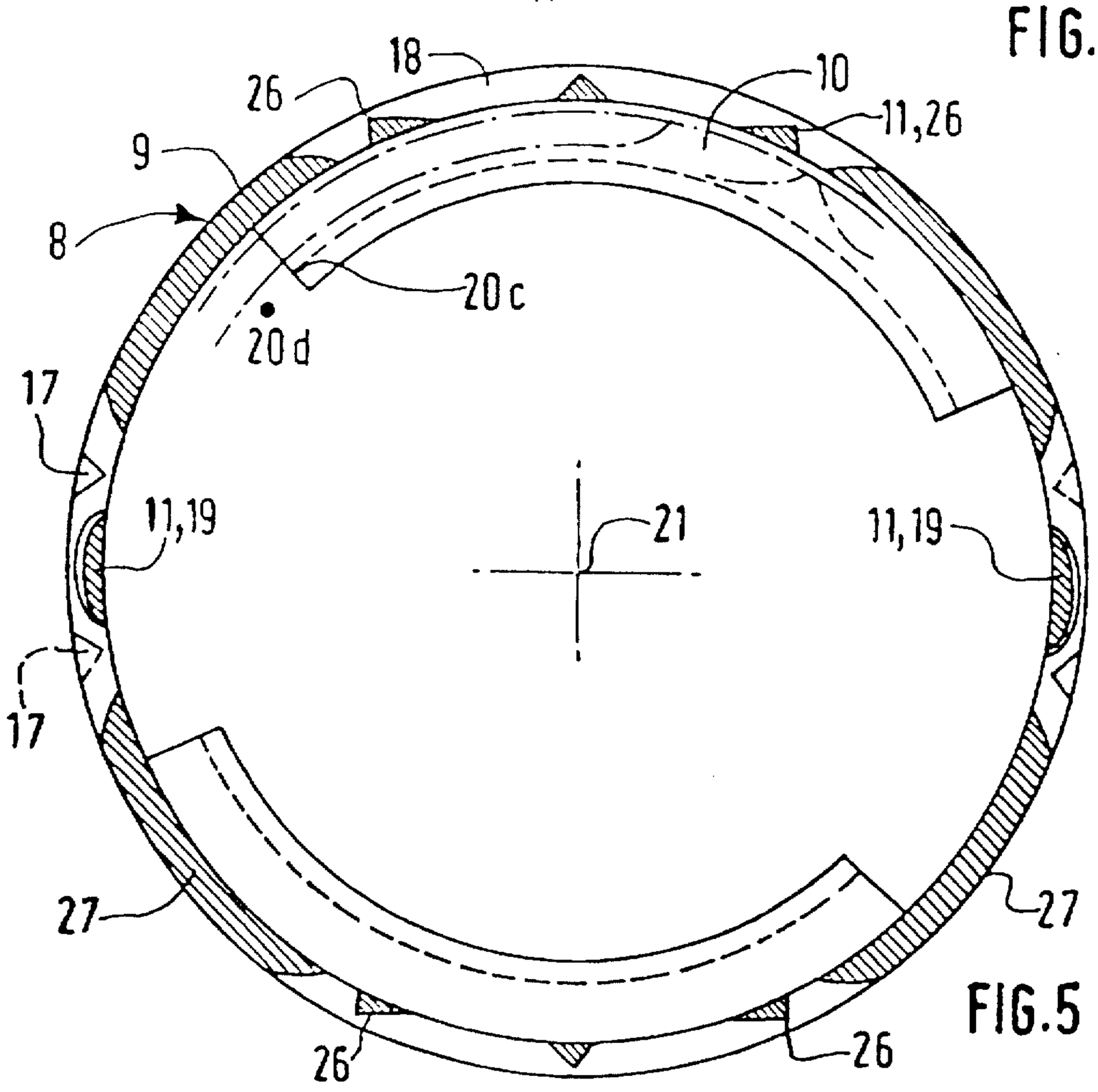
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FIG.5

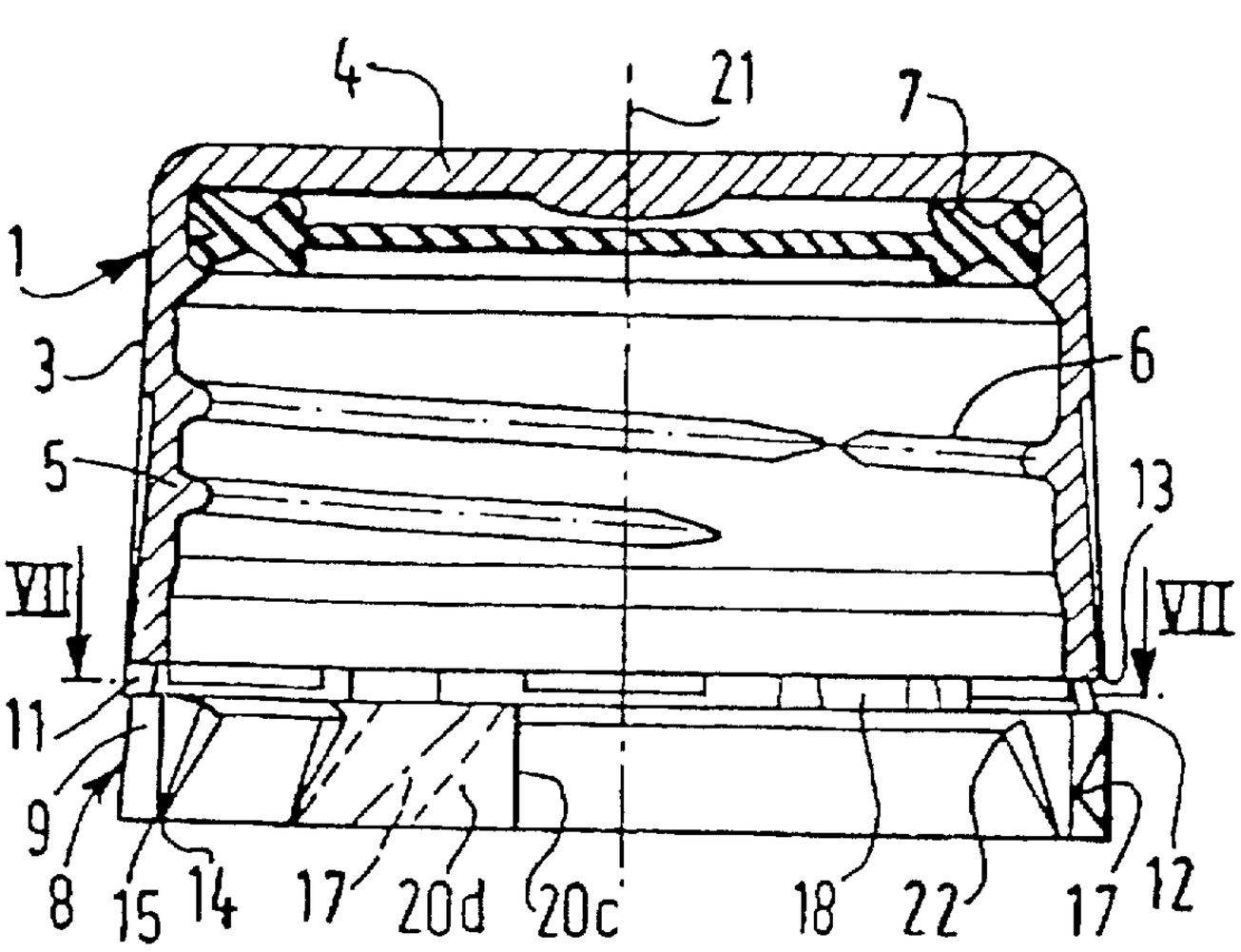


FIG.6

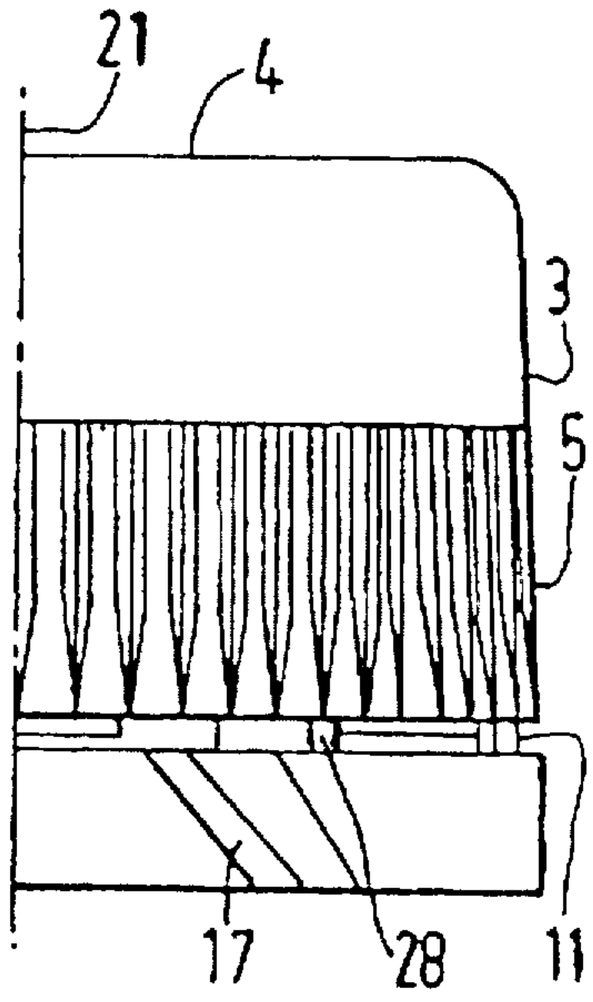


FIG.8

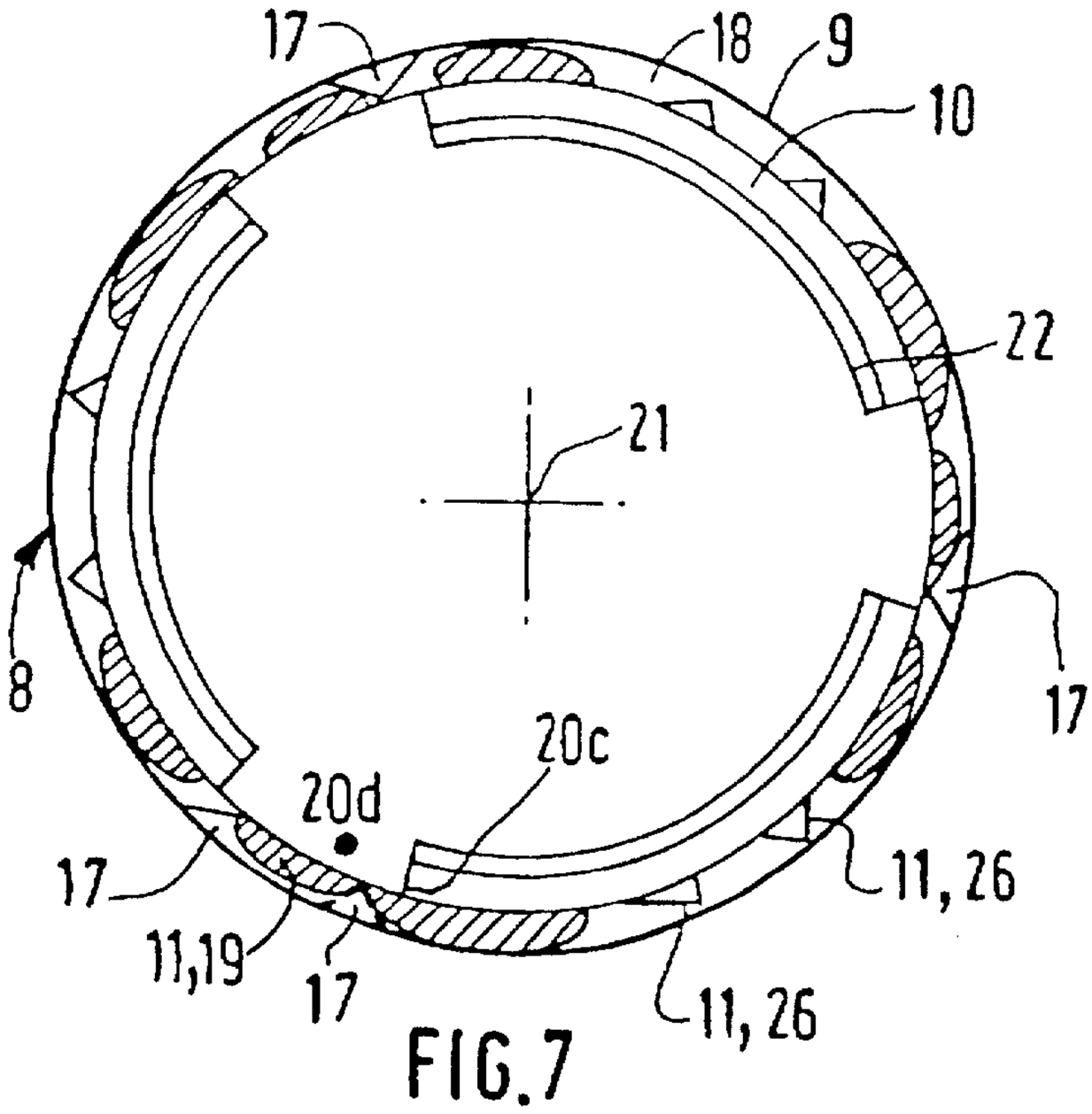


FIG.7

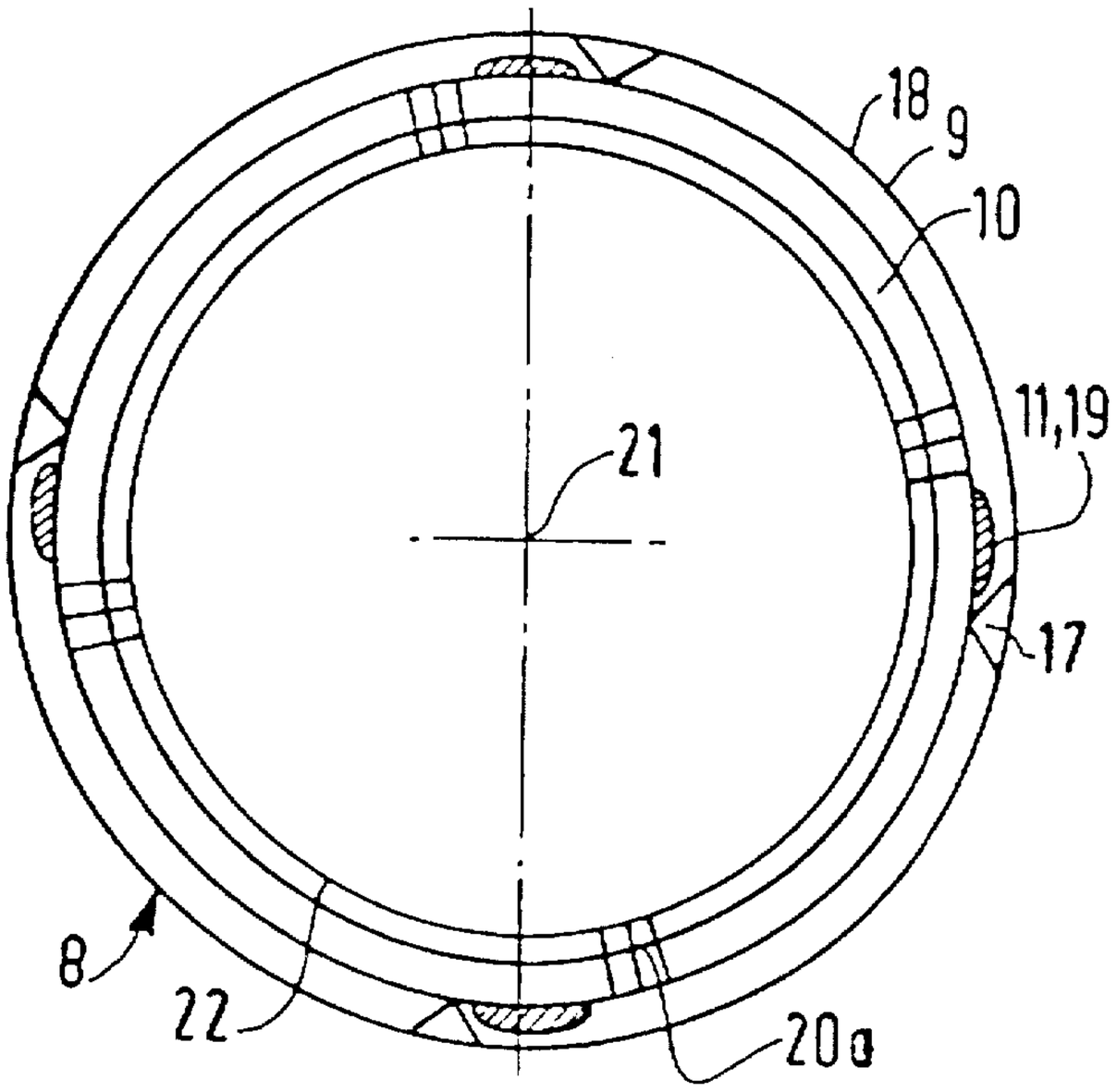


FIG.9

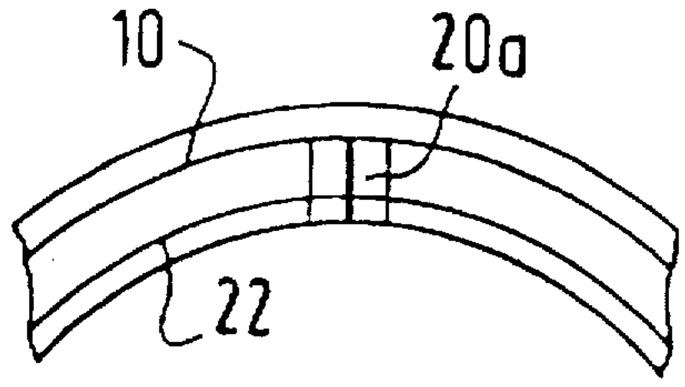


FIG.11A

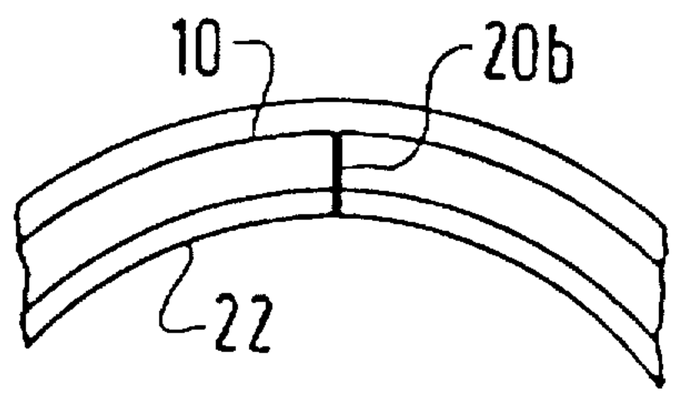


FIG.11B

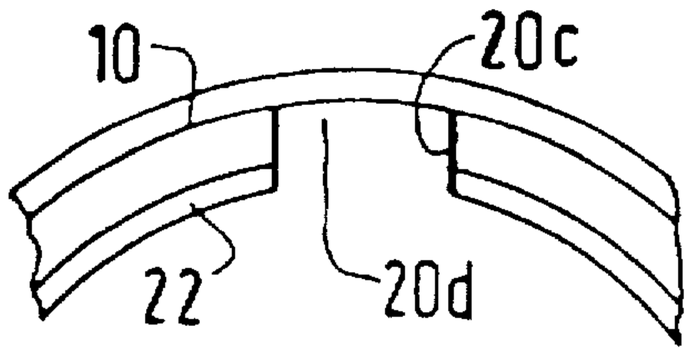


FIG.11G

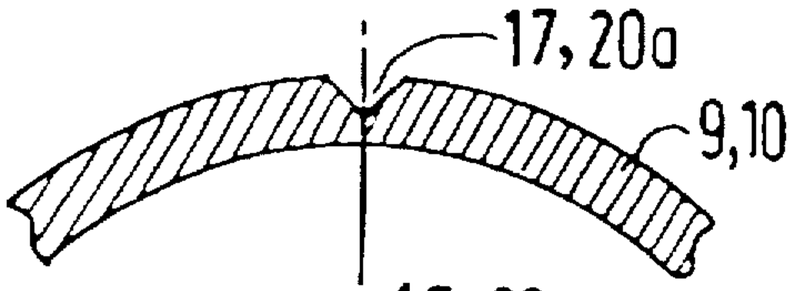


FIG.10A

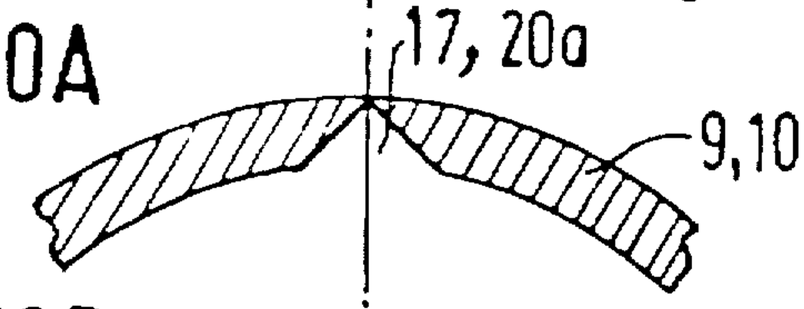


FIG.10B

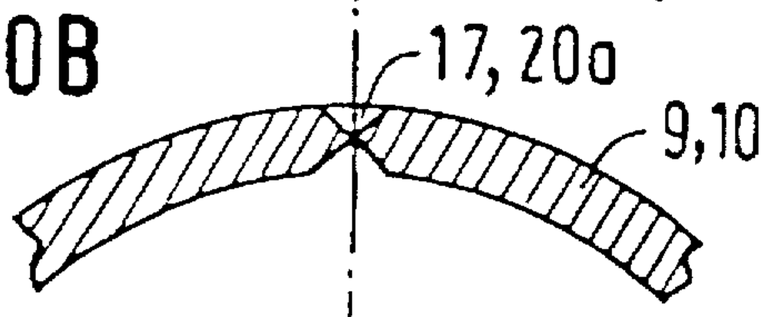
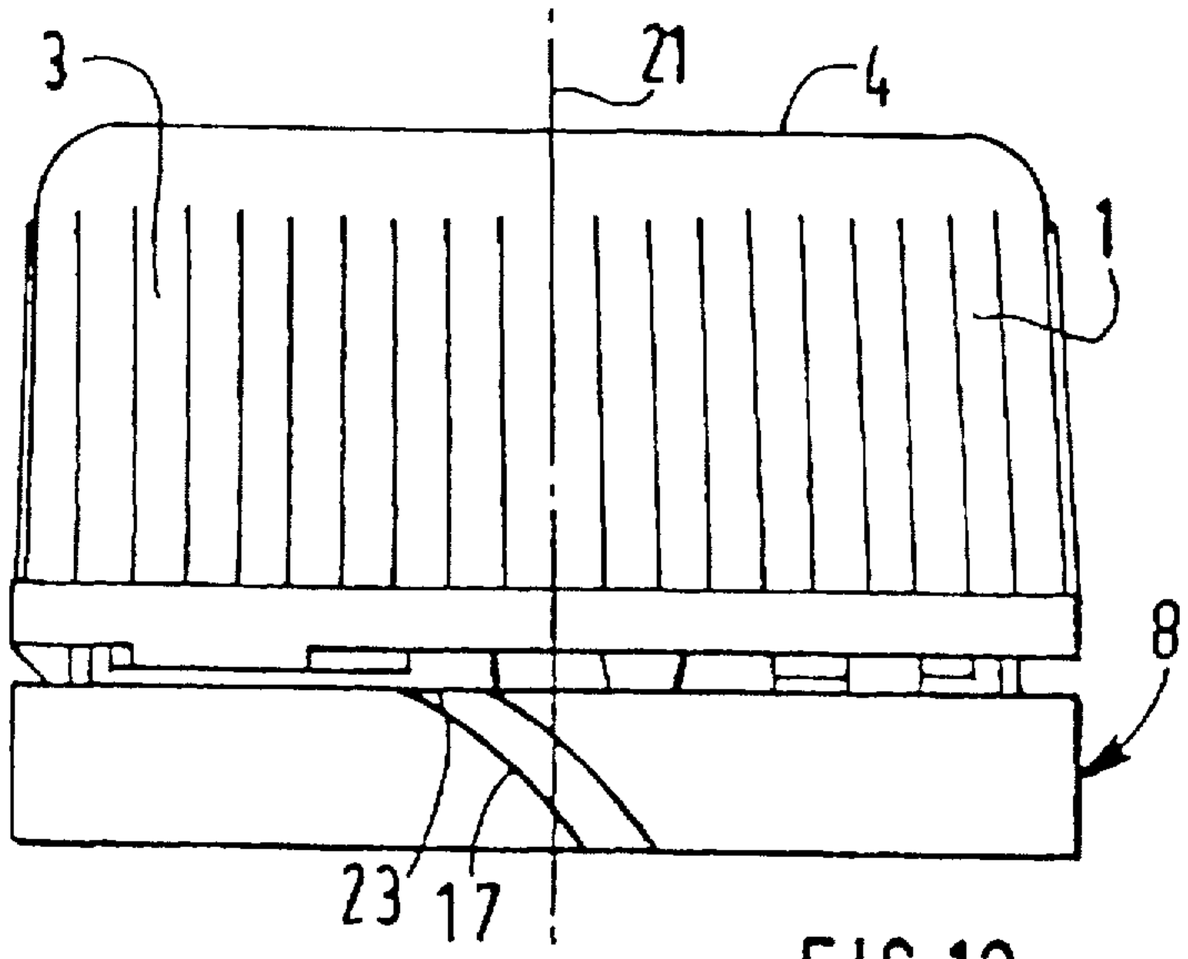


FIG.10C



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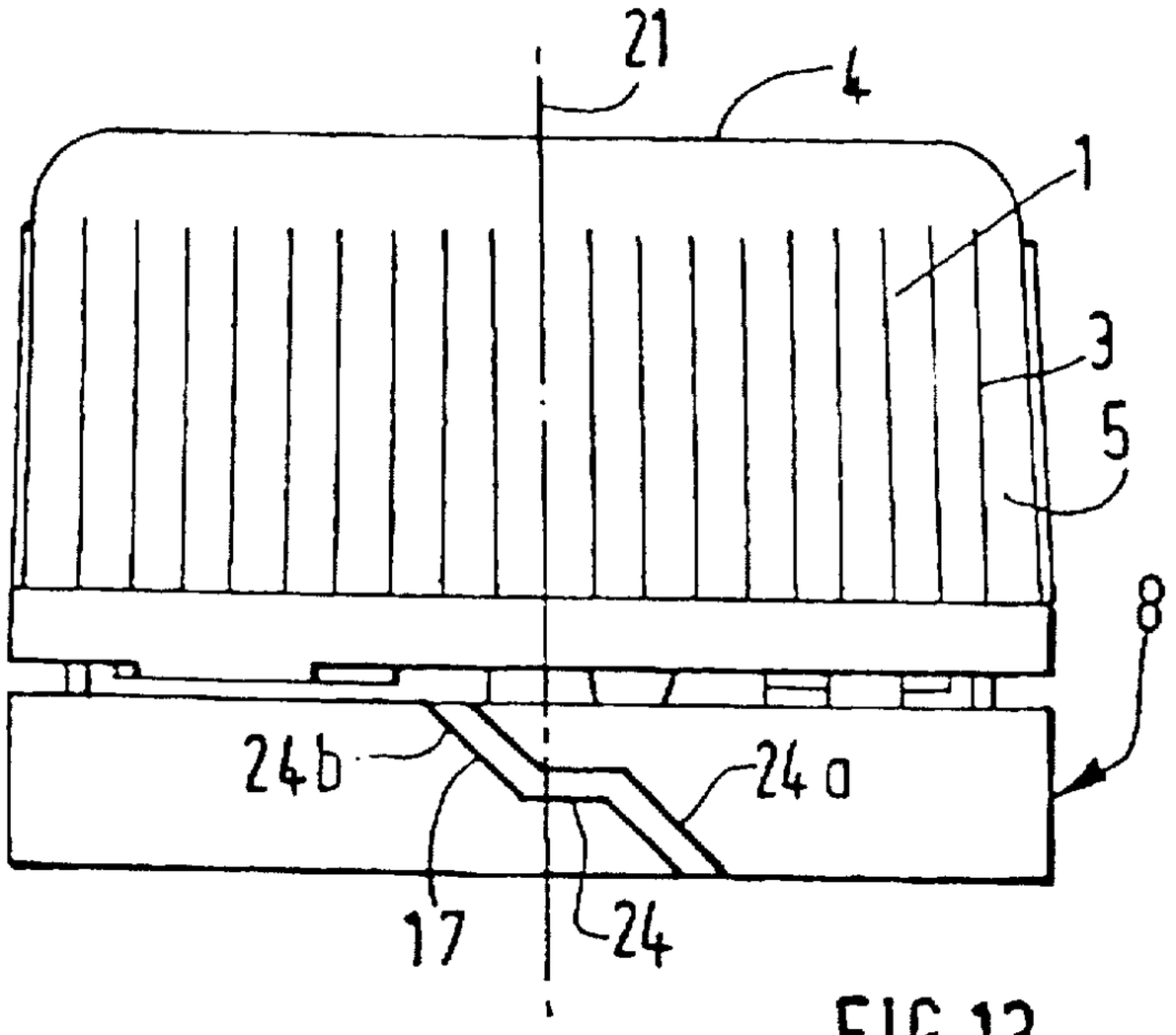

FIG.13

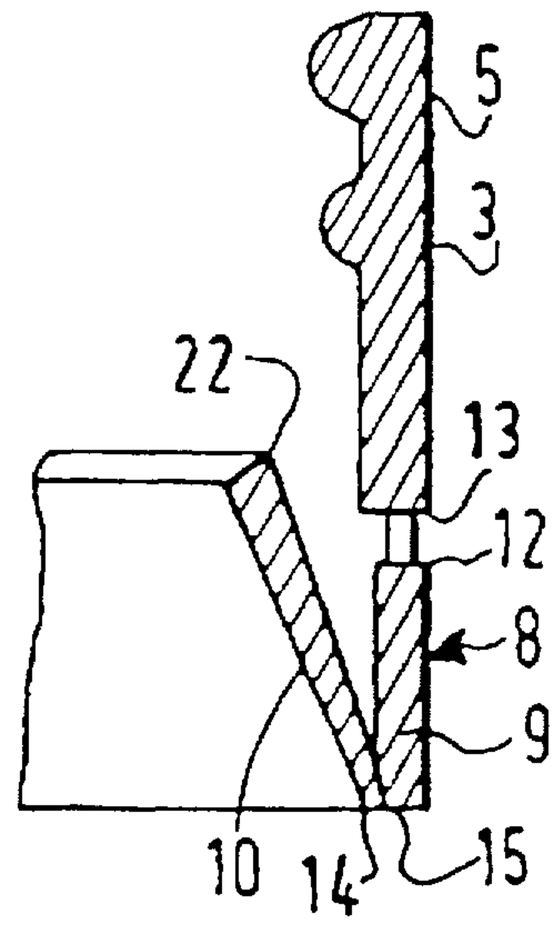

FIG.14

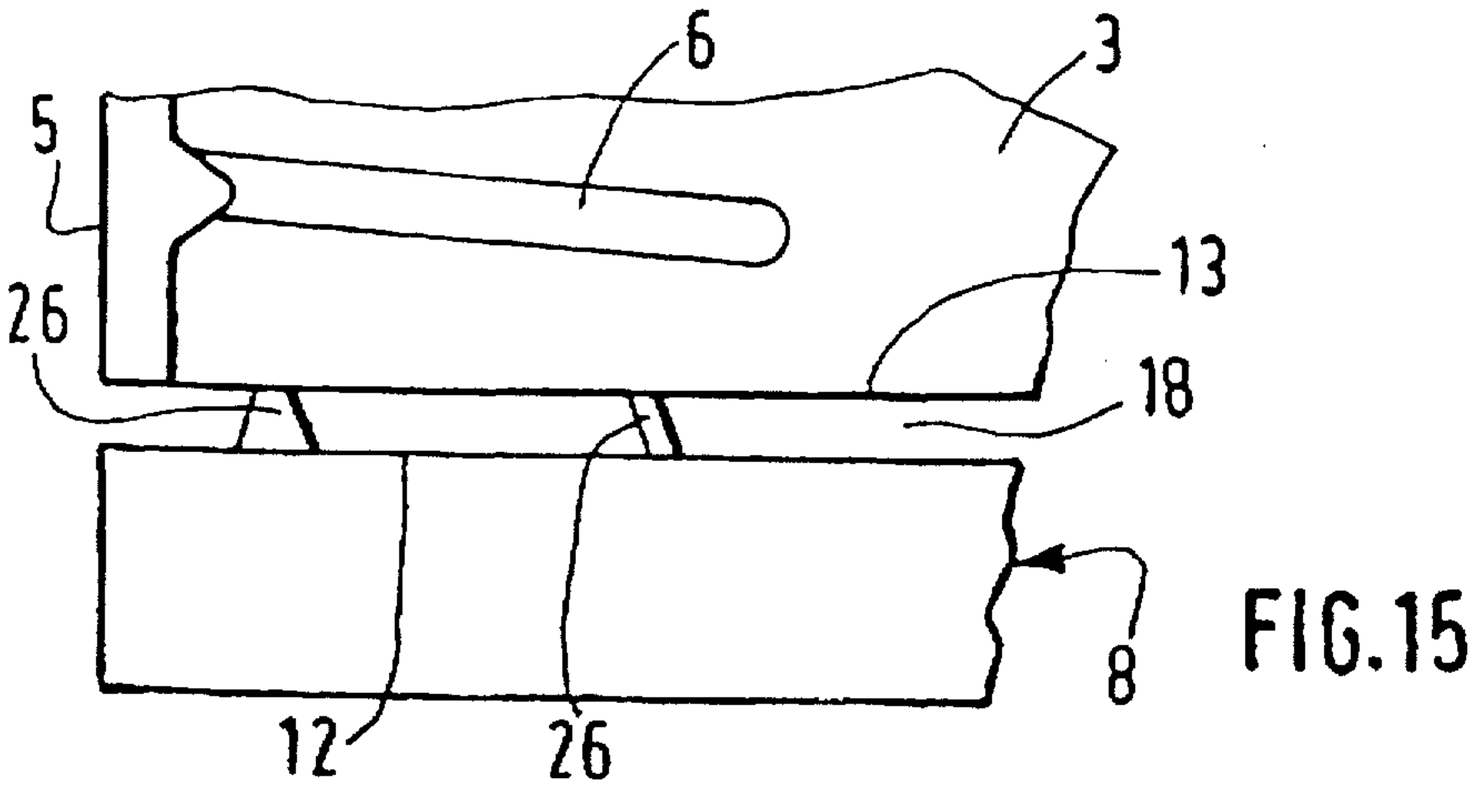

FIG.15

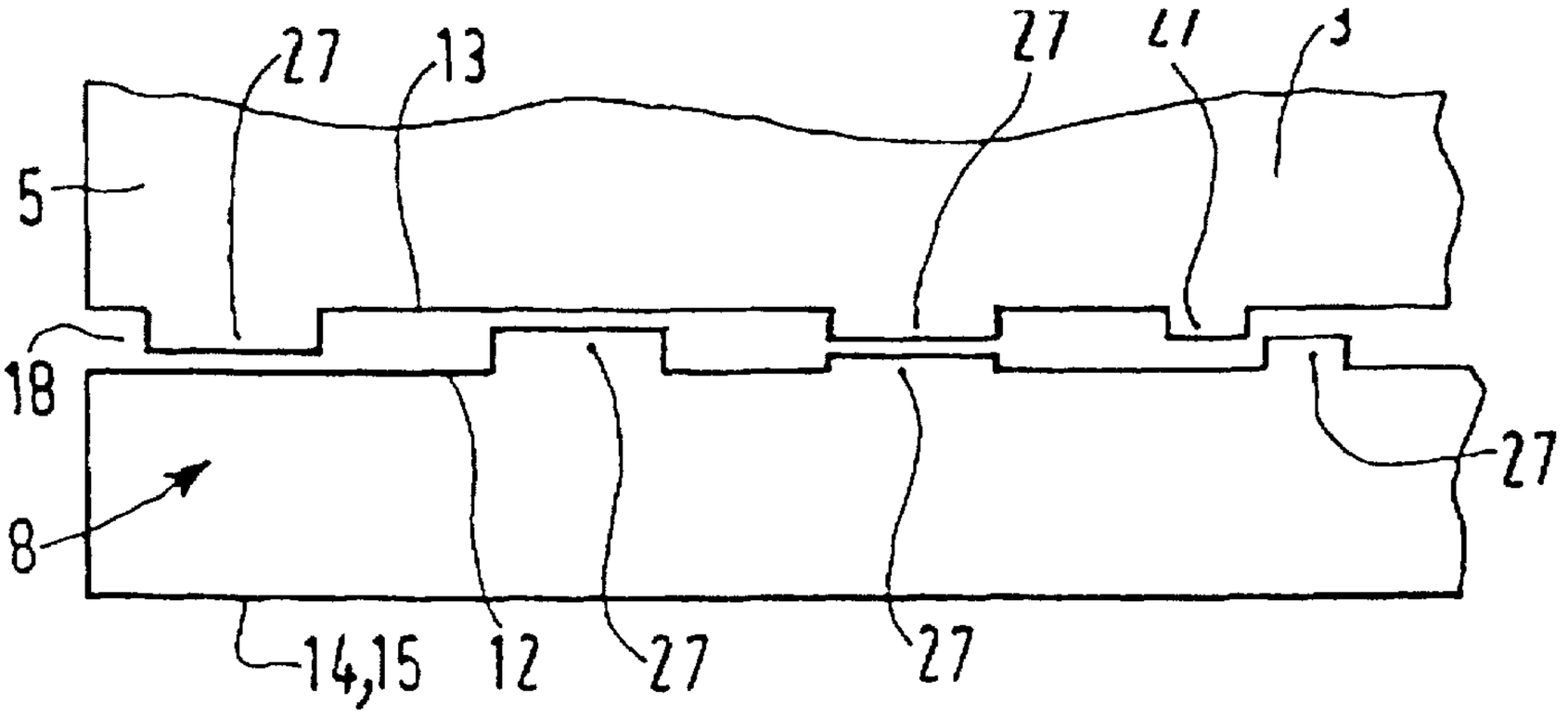

FIG.16

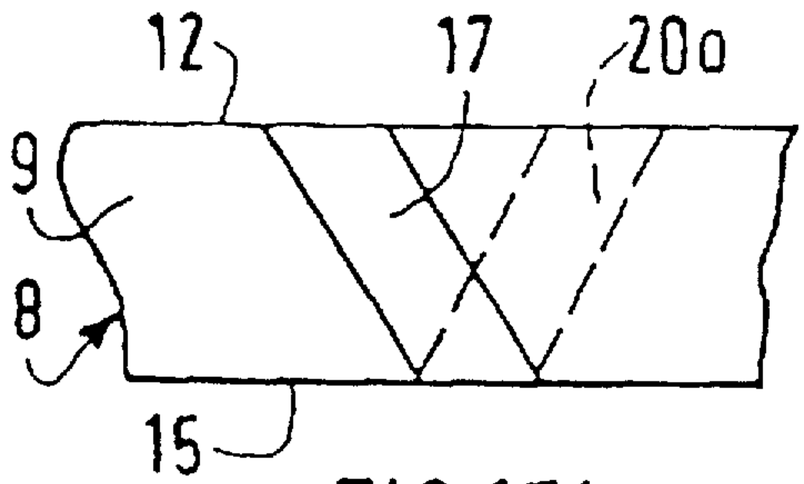

FIG.17A

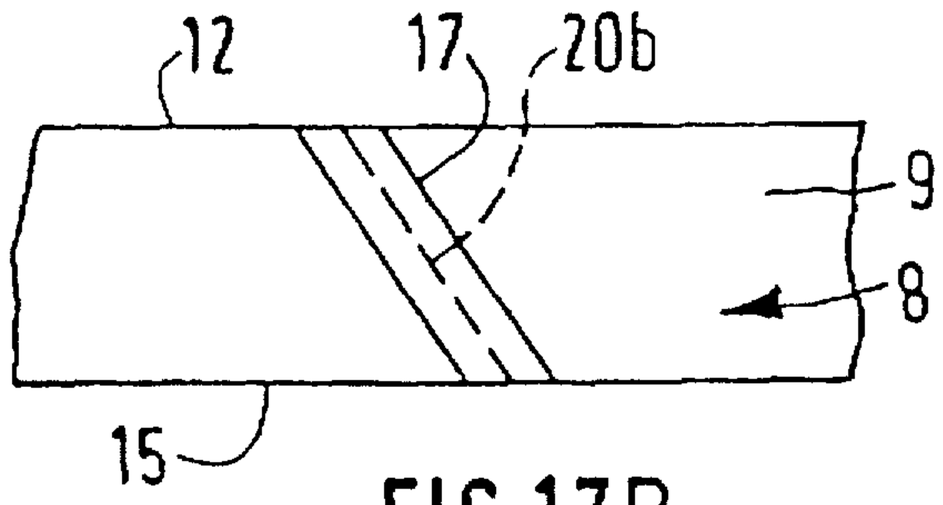

FIG.17B

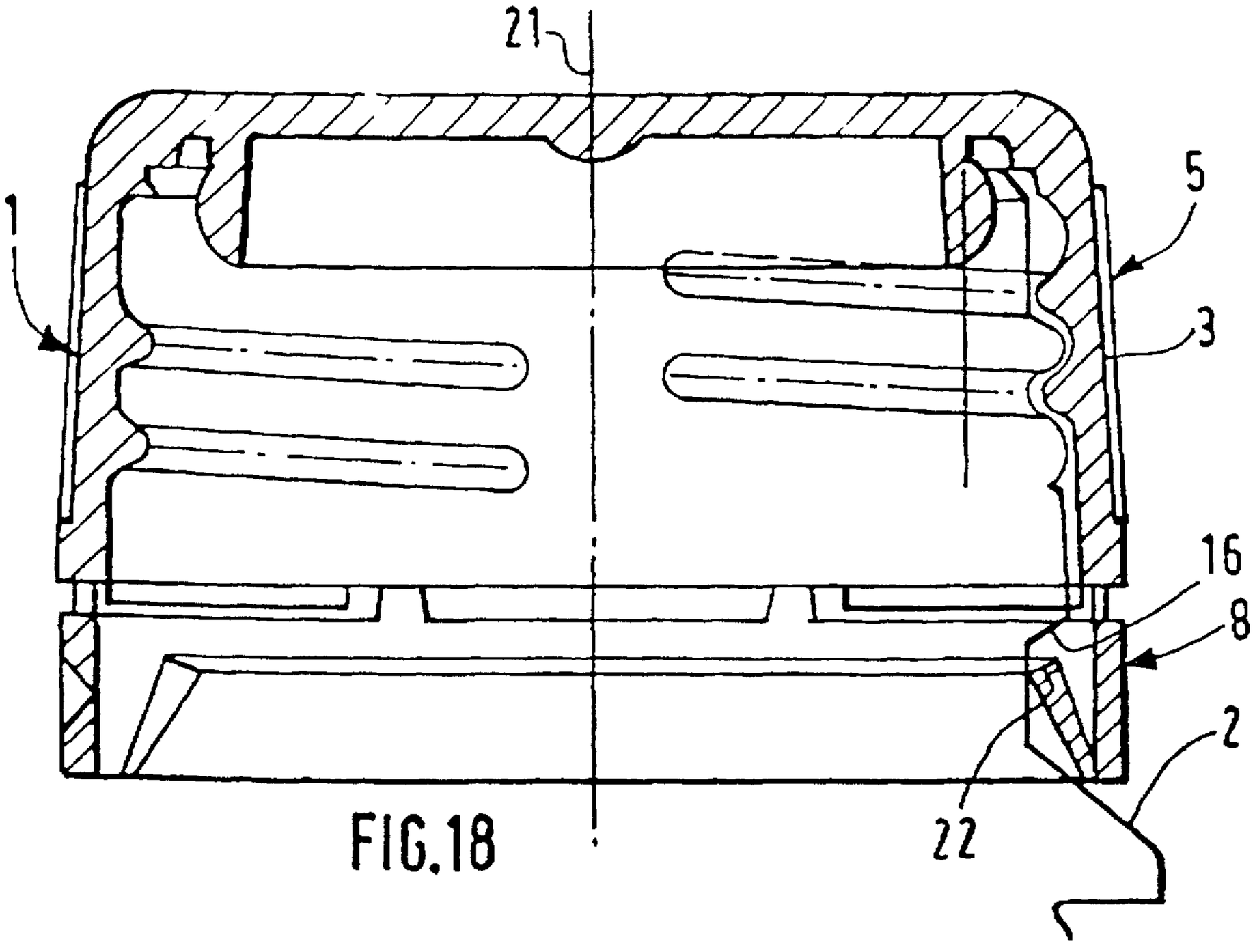

FIG.18

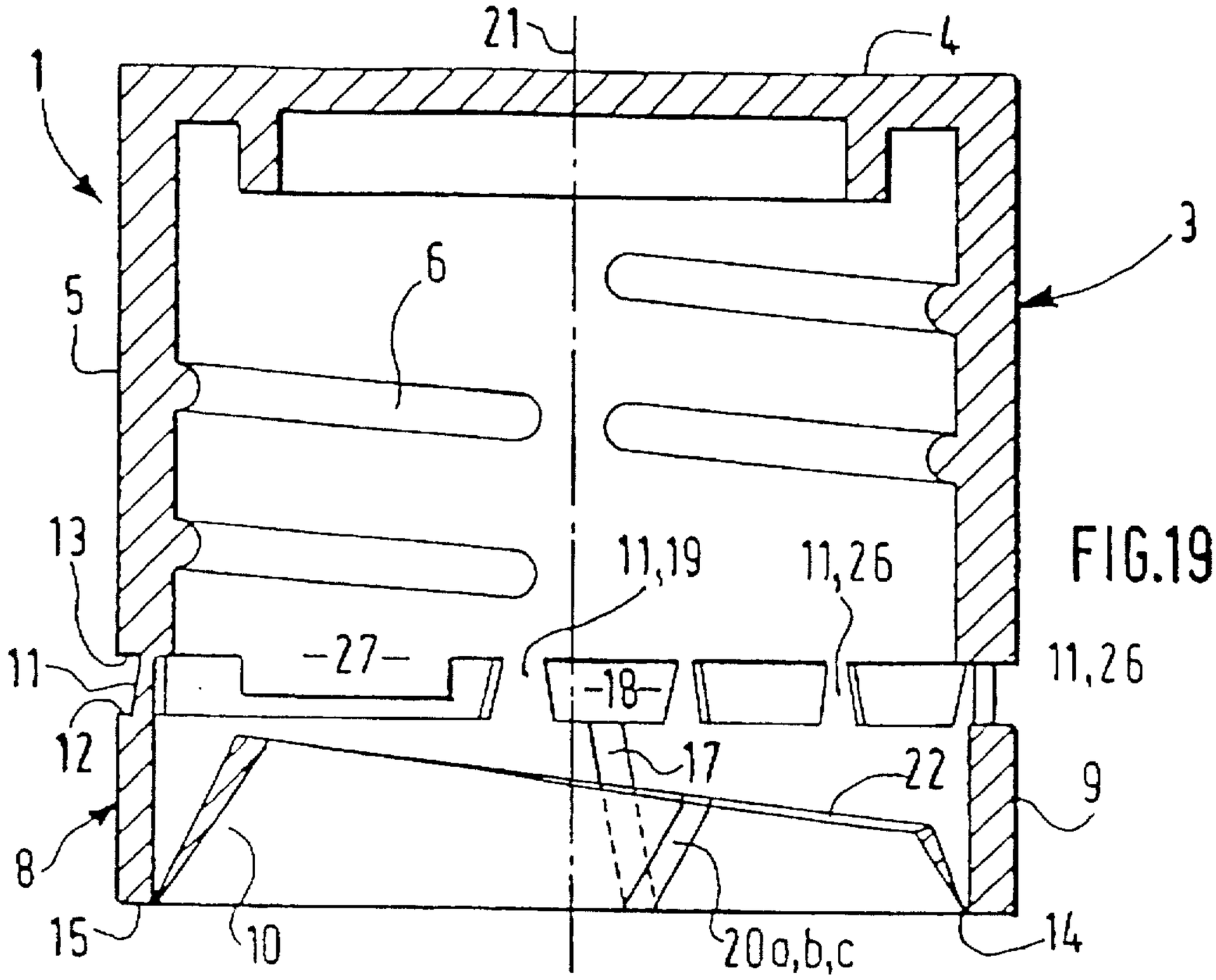
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FIG.19

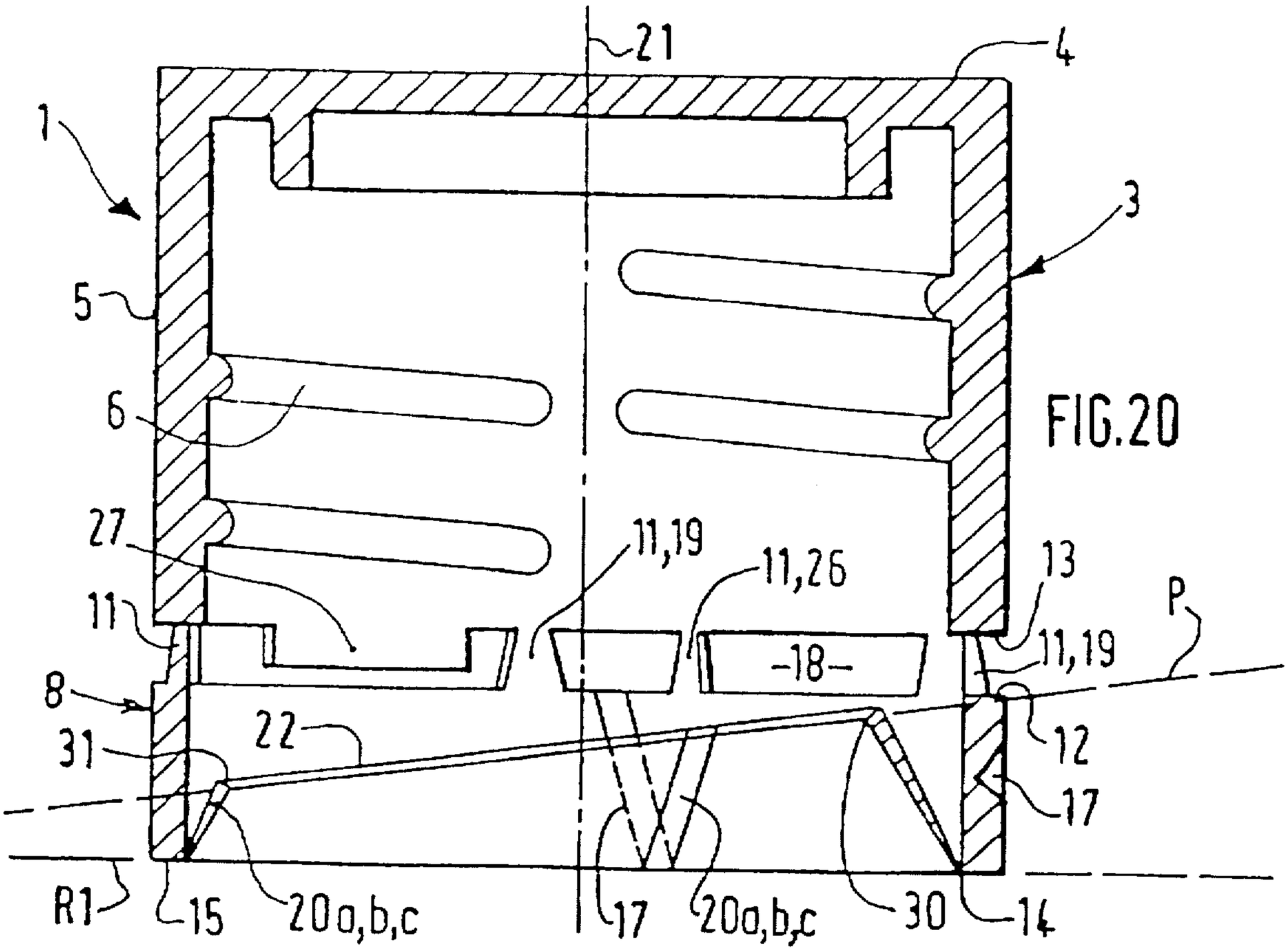
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FIG.20

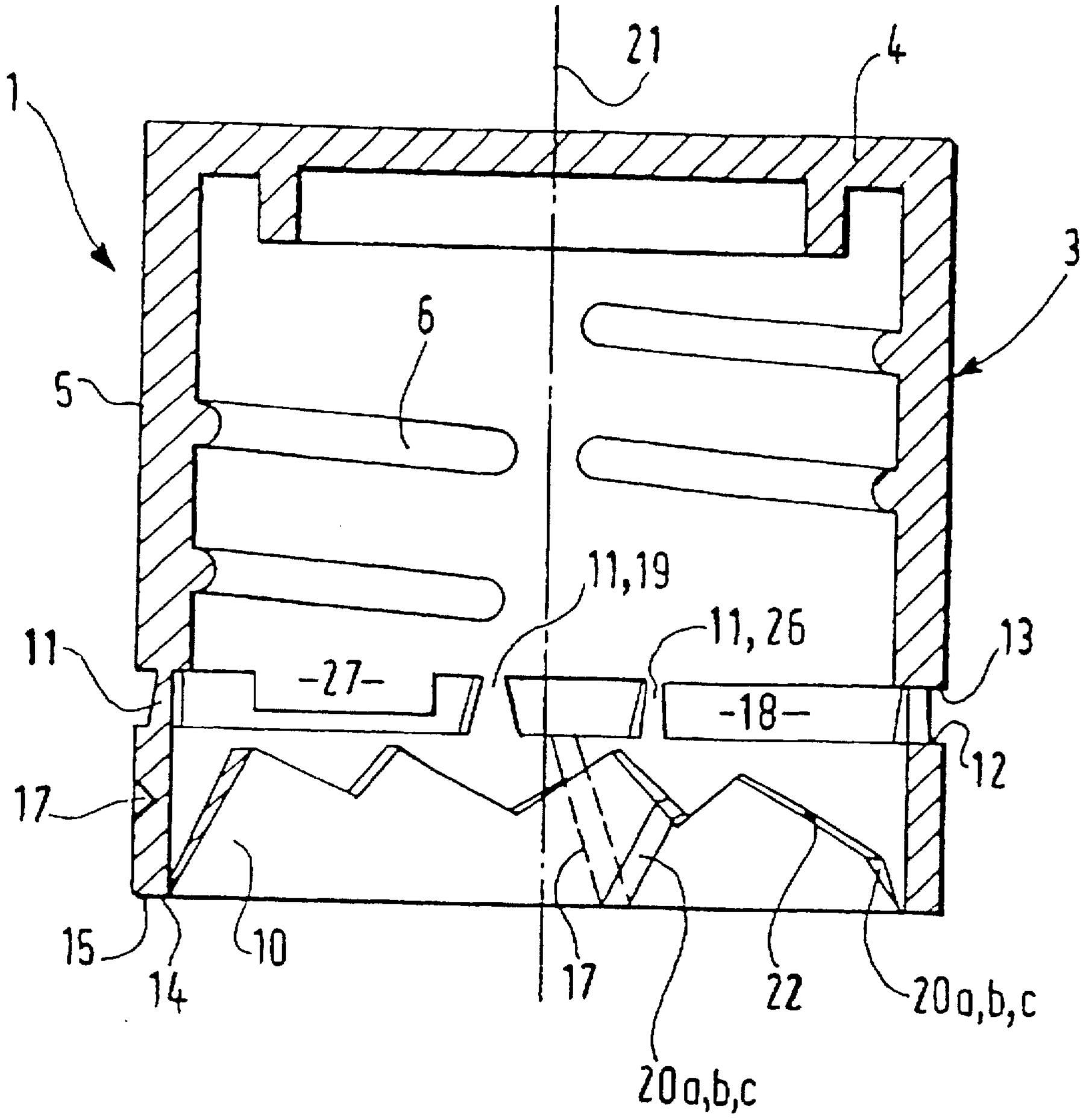

FIG.21

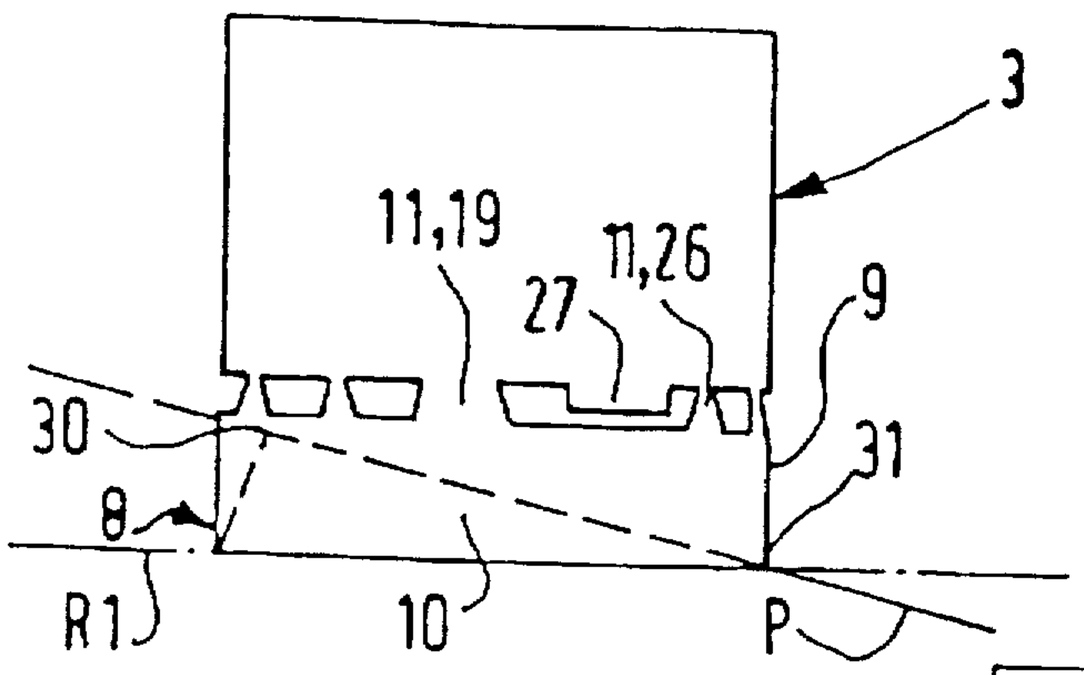

FIG.22A

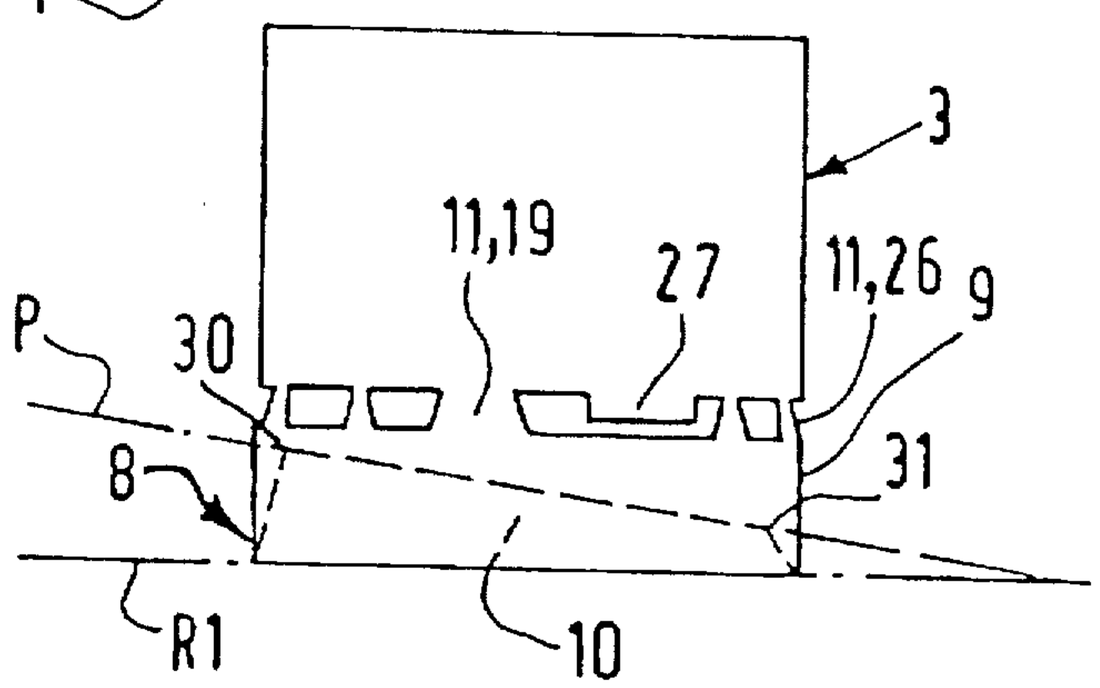

FIG.22B

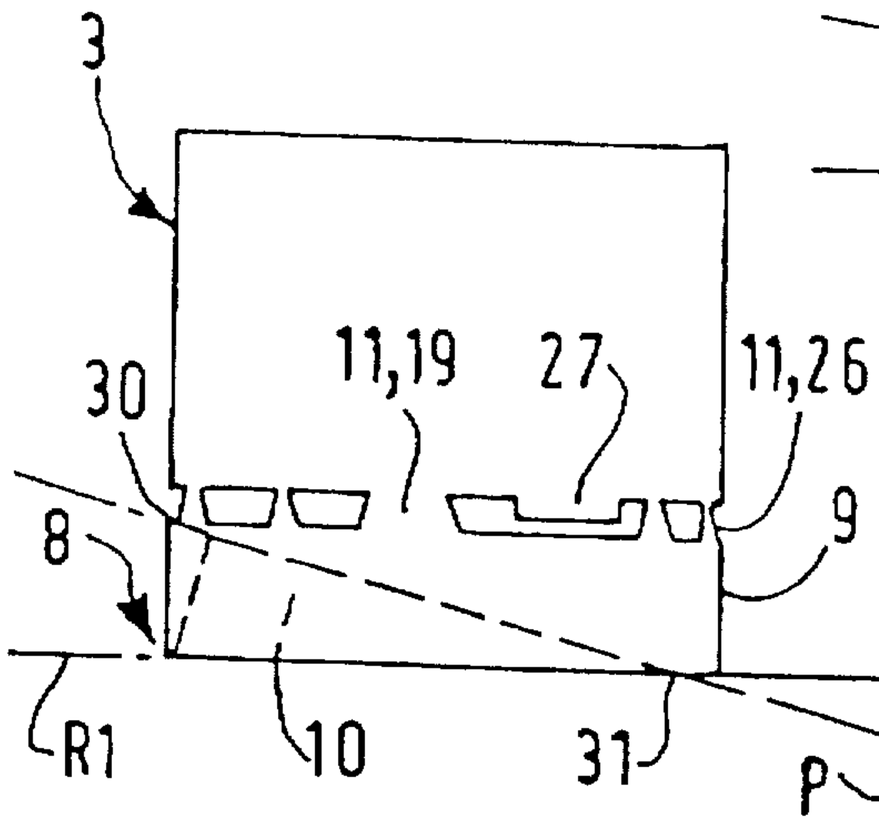

FIG.22C

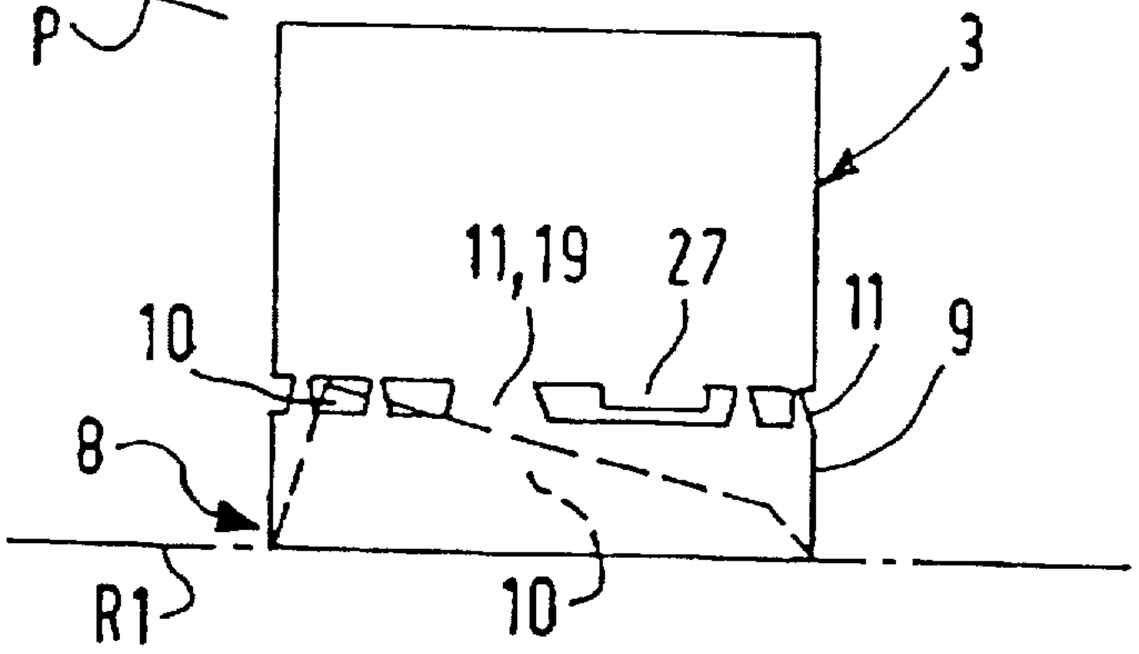

FIG.22D

SCREW CAP AND A TAMPER-PROOFING RING, PACKAGING PROVIDED WITH SUCH A CAP, A METHOD OF MANUFACTURING SUCH A CAP, AND A METHOD OF MANUFACTURING SUCH PACKAGING

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a screw cap made of a plastics material and including a tamper-proofing ring having an inner portion projecting back inside the ring; packaging comprising the combination of such a cap, and of a container; a method of manufacturing such a cap; and a method of manufacturing such packaging.

2. Description of the Related Art

Screw caps made of plastics materials are known. Such a cap comprises:

a closing portion having a transverse end wall and a skirt adjoining the wall, and provided with an inside thread;

optional sealing means mounted in or integral with the closing portion; and

a tamper-proofing ring made in one piece with the closing portion, and having an outer portion forming a closed loop, disposed in alignment with the skirt, and connected thereto via link means spaced apart circumferentially between the free edge of the outer portion and the free edge of the skirt, the other edge of the outer portion directly adjoining a thin edge of an inner portion that can be pivoted about its thin edge relative to the outer portion, the inner portion being designed to project back inside the ring towards the transverse end wall such that it interferes with a projection on a container on which the cap is to be screwed.

In the state of the art disclosed in Documents U.S. Pat. No. 4,613,052, U.S. Pat. No. 4,352,436, and U.S. Pat. No. 4,653,657, the link means linking the outer portion, and therefore the tamper-proofing ring, to the skirt are constituted by breakable bridges that are broken on unscrewing the cap.

On unscrewing the cap, the breakable bridges are broken and the ring is separated from the closing portion while remaining threaded over the neck of the container from which it is difficult to remove the ring since the inner portion of the ring abuts against the projection on the container.

SUMMARY OF THE INVENTION

An object of the invention is to provide a screw cap of the above-mentioned type in which the tamper-proofing ring can be removed from the neck of the container.

To this end, in a first aspect, the invention provides a screw cap made of a plastics material, and of the above-described type, in which a breakable zone of the outer portion of said tamper-proofing ring enabling it to be opened on unscrewing the cap leads firstly to an empty space between the outer portion and the skirt, which empty space is delimited downstream, with respect to the unscrewing direction of the cap, by at least one non-breakable fastening which does not break on unscrewing the cap, and which is part of said link means, and secondly to a breakable zone, to a cut, or to a gap in the inner portion so that, on unscrewing the cap, the tamper-proofing ring remains associated with the closing portion via the non-breakable fastening(s).

The cap has other characteristics, some of which are optional: a breakable zone comprises a thin region in the corresponding portion, i.e. the outer portion or the inner

portion. Such a thin region is constituted by a recess in the outer portion or in the inner portion, such as a groove in the outside face of the portion and/or a groove in its inside face. A breakable zone of the outer portion extends in a generally inclined direction relative to the axis of the cap in the opposite direction to the thread. A breakable zone or a cut in the inner portion extends in a generally inclined direction relative to the axis of the cap in the same direction as or in the opposite direction to the thread. The general direction of the inclination of the breakable zone or of the cut forms an angle lying in the range 30° to 80° with the axis of the cap, and preferably an angle equal to or in the vicinity of 45°. A breakable zone or a cut in the inner portion or in the outer portion extends substantially along a rectilinear direction. A breakable zone in the outer portion leads to the empty space between the outer portion and the skirt substantially orthogonally to the axis of the cap so that it substantially extends the empty space. A breakable zone has at least one segment that is orthogonal to the axis of the cap and that is interposed between two segments that are inclined relative to the axis. A non-breakable fastening is immediately adjacent to the end of a breakable zone in the outer portion leading to the free edge thereof. A non-breakable fastening is strong enough not to break on unscrewing the cap, but it is not strong enough to withstand a large enough traction force applied by the user after the cap has been unscrewed so as to break the fastening. A gap in the inner portion is constituted by an empty space that extends circumferentially in said inner portion. The empty space of such a gap in the inner portion extends over an arc lying in the range 20° to 100°, and preferably approximately in the range 30° to 90°. The empty space of such a gap in the inner portion extends over an arc of angle substantially corresponding to the angle through which a facing non-breakable fastening extends. The two edges delimiting a gap in the inner portion are disposed either substantially in axial planes of the cap, or such that they diverge from the thin edge of the inner portion to its free edge. The edges delimiting a gap in the inner portion are inclined relative to the axis of the cap at an angle equal to or in the vicinity of 45°. The outer portion has a thickness that remains substantially constant over its entire periphery and over its entire axial height except in the breakable zone(s) with which it is provided, the thickness being not more than substantially equal to, or optionally less than, the thickness of the skirt. The inner portion extends over an axial height which is not more than the axial height of the outer portion which entirely covers the inner portion. In particular, the inner portion extends over about one half of the axial height of the outer portion. Or conversely, the inner portion extends over an axial height that is greater than the axial height of the outer portion which covers the inner portion in part only, with the inner portion partially overlapping the skirt. The the right axial section of the inner portion is generally triangular or trapezium-shaped. The link means are constituted by the non-breakable fastenings only, or conversely, they are constituted both by the non-breakable fastenings and also by breakable bridges that are spaced apart circumferentially, and that are broken on unscrewing the cap. In the first case, at least two breakable zones are provided in the outer portion and in the inner portion. The right cross-section of a breakable bridge is generally triangular with a base adjoining the inside face of the skirt, and the inside face of the outer portion, and an opposite vertex facing outwards. Said vertex is disposed slightly set back from the outside face of the skirt and from the outside face of the outer portion. In axial elevation, a breakable bridge is generally triangular or trapezium-shaped with a large side

adjoining the outer portion, and a vertex or a small side adjoining the skirt. A breakable bridge extends in a generally axial direction. Conversely, a breakable bridge extends in a generally inclined direction relative to the axis of the cap. This direction is the direction of the thread of the cap. The cap includes four, five, or six breakable bridges. A non-breakable fastening is spaced apart from the first breakable bridge situated upstream relative to the unscrewing direction of the cap by an arc of angle lying approximately in the range 45° to 90°. A non-breakable fastening also serves to constrain the ring to rotate with the closing portion. The cap includes at least one axial abutment in the form of a projection on the skirt and/or a projection on the outer portion, such a projection being situated in the empty space provided between the skirt and the outer portion, a projection on the skirt extending the skirt from its free edge towards the outer portion, and a projection on the outer portion extending the outer portion from its free edge towards the skirt. An abutment extends circumferentially over an arc of less than about 40°. Two adjacent abutments are separated from each other by at least one breakable bridge or by a non-breakable fastening. Two adjacent abutments are separated from each other by not more than four breakable bridges. A non-breakable fastening is separated from the first breakable bridge situated upstream relative to the unscrewing direction of the cap by an abutment. An abutment adjoining the skirt has rounded edges and has a radial thickness that is substantially equal to the radial thickness of the skirt. The abutments occupy approximately in the range one third to one half of the circumference of the empty space between the skirt and the outer portion. A non-breakable fastening is situated substantially diametrically opposite from another non-breakable fastening or from a breakable bridge. The inner portion is inclined relative to the outer portion at an angle lying approximately in the range 10° to 60°, more specifically approximately in the range 20° to 40°, and in particular equal to or in the vicinity of 30°. The inner portion has its free edge radially spaced apart from the outer portion or from the skirt.

In a first variant embodiment, the cap includes a single non-breakable fastening, and a single breakable zone, cut, or gap in the inner portion. In this variant, four breakable bridges are substantially uniformly distributed over one half of the periphery of the cap opposite from the breakable zone of the outer portion, and from the breakable zone, cut, or gap in the segments of the inner portion that are separated by said breakable zones, cuts, or gaps. Three abutments are also provided, two of which are diametrically opposite each other, the third abutment being diametrically opposite the non-breakable fastening.

In a second variant embodiment, the cap includes two substantially diametrically opposite non-breakable fastenings, and two substantially diametrically opposite breakable zones, cuts, or gaps in the inner portion. In this variant six breakable bridges are provided that are substantially diametrically opposite one another, and that are situated in the middles of the inner portion. Four abutments are also provided opposite one another in pairs, and separated from one another either by the breakable bridges or by the non-breakable fastenings.

In a third variant embodiment, the cap includes three non-breakable fastenings disposed at substantially 120° from one another, and three breakable zones, cuts, or gaps in the inner portion also disposed at substantially 120° from one another. In this variant, six breakable bridges are disposed at substantially 120° from one another, situated substantially in the middles of the inner portion, and diametrically opposite the non-breakable fastenings. Six abutments are also disposed at substantially 120° from one another.

In a fourth variant embodiment, the cap includes four non-breakable bridges spaced apart from one another by substantially one fourth of a turn. In this variant, four breakable bridges and four breakable zones, cuts or gaps in the inner portion are provided that are spaced apart from one another by substantially one fourth of a turn, non-breakable fastenings being provided as the only link means, and four breakable zones in the inner portion being provided spaced apart from one another by substantially one fourth of a turn.

In a fifth variant embodiment, the free edge of the inner portion lies in a single plane inclined relative to a reference plane which is orthogonal to the axis of the cap and in the same direction as the thread of the cap.

In a sixth variant embodiment, the free edge of the inner portion lies in a single plane inclined relative to a reference plane which is orthogonal to the axis of the cap and in the opposite direction to the thread of the cap.

In a seventh variant embodiment, the free edge of the inner portion is situated in several planes inclined relative to a reference plane which is orthogonal to the axis of the cap. In this case the internal portion may form some number of indentations that are of greater or lesser size.

In a second aspect, the invention provides packaging comprising the combination of such a cap and of a container having a neck which is provided firstly with an outside thread in the vicinity of its opening, which thread co-operates with the inside thread of the cap, and secondly with an annular projection in the vicinity of the base of the neck, the projecting inner portion of the cap abutting against the annular projection at the opposite end of the neck from the outside thread.

In such packaging, the inner portion is inclined relative to the outside portion at an angle such that unscrewing the cap causes the inner portion to pivot about its thin edge in the direction tending to move it away from the outer portion.

In a third aspect, the invention provides a method of manufacturing such a cap, the method being characterized by the fact that, firstly the cap is made by injection with the inner portion extending the outer portion, and the inner portion is then pivoted about its thin edge so that it projects back inside the ring.

In a final aspect, the invention provides a method of manufacturing packaging as mentioned above, in which method the cap is screwed onto the container once the inner portion has been pivoted so that it projects back inside the ring.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood on reading the following description of several embodiments and of several variants given with reference to the accompanying drawings, in which:

FIG. **1** is a diagrammatic axial section view of a first variant embodiment of the cap;

FIG. **2** is a diagrammatic cross-section view on line II—II of FIG. **1**;

FIG. **3** is a diagrammatic elevation view of the cap of the first variant;

FIG. **4** is a diagrammatic view partly in axial section (left half-view), and partly in elevation (right half-view) of a second variant of the cap of the invention;

FIG. **5** is a cross-section view on line V—V of FIG. **4**;

FIG. **6** is a diagrammatic axial section view of a third variant of the cap;

FIG. **7** is a diagrammatic cross-section view on line VII—VII of FIG. **6**;

FIG. **8** is an elevation half-view of the cap of the third variant;

FIG. **9** is a diagrammatic cross-section view of a fourth variant of the cap;

FIGS. **10**A, **10**B, and **10**C are three fragmentary diagrammatic views showing embodiments of a breakable zone in the outer portion or in the inner portion;

FIGS. **11**A, **11**B, and **11**C are three fragmentary diagrammatic views of the inner portion of the ring showing implementations of a breakable zone, of a cut, and of a gap;

FIG. **12** and FIG. **13** are diagrammatic elevation views showing two embodiments of the breakable zone of the outer portion;

FIG. **14** is a fragmentary diagrammatic axial section view showing an embodiment of the cap in which the axial height of the inner portion of the ring is greater than the axial height of the outer portion of the ring;

FIG. **15** is a fragmentary diagrammatic elevation view showing two embodiments of breakable bridges;

FIG. **16** is a fragmentary diagrammatic elevation view showing four embodiments of abutments for the cap of the invention;

FIGS. **17**A and **17**B are fragmentary diagrammatic elevation views of the tamper-proofing ring showing the relative disposition of a breakable zone in the outer portion, and of a breakable zone, a cut, or a gap in the inner portion;

FIG. **18** is a diagrammatic axial section view of the cap of the invention mounted on a container;

FIG. **19** is a diagrammatic axial section view of a fifth variant embodiment of the cap;

FIG. **20** is a diagrammatic axial section view of a sixth variant embodiment of the cap;

FIG. **21** is a diagrammatic axial section view of a seventh variant embodiment of the cap; and

FIGS. **22***a*, **22***b*, **22***c*, and **22***d* are diagrammatic elevation views showing various embodiments of the inner portion in dashed lines.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention relates to a cap **1** for a container **2**, the resulting assembly forming packaging.

The cap **1** is of the screw type and is made of a plastics material.

It includes a closing portion **3** having a transverse end wall **4**, and a skirt **5** adjoining the wall **4** and provided with an inside thread **6**.

The cap **1** may further include optional sealing means **7** which are either integral with the closing portion (see FIG. **1**), or else they are separate and mounted therein (see FIG. **4**).

The cap **1** also includes a tamper-proofing ring **8** which is made in one piece with the closing portion **3**.

The ring **8** comprises an outer portion **9** and an inner portion **10**.

The outer portion **9** forms a closed loop and is disposed in alignment with the skirt **5**.

The outer portion **9** is connected to the skirt **5** by link means **11** that are spaced apart from one another circumferentially, and that are situated between the free edge **12** of the outer portion **9** and the free edge **13** of the skirt **5**.

The inner portion **10** directly adjoins the outer portion **9**. For that purpose, the inner portion **10** has a thin edge **14** adjoining the other edge **15** of the outer portion **9**. In this way, the outer portion **9** is delimited by its free edge **12** on the skirt side, and by its other edge **15** on the opposite side.

The inner portion **10** is capable of pivoting about its thin edge **14** relative to the outer portion **9**.

The inner portion **10** is designed to project back inside the ring **8** towards the transverse wall **4**.

When the cap **1** is screwed onto the container **2**, the inner portion **10** interferes with a projection **16** on the container **2** (see FIG. **18**).

The outer portion **9** includes one or more breakable zones **17** which enable the outer portion to be opened on unscrewing the cap **1**.

Firstly, such a breakable zone **17** leads to an empty space **18** between the outer portion **9** and the skirt **5**. The empty space **18** is delimited downstream by at least one non-breakable fastening **19** that does not break on unscrewing the cap. Such a non-breakable fastening **19** is part of the link means **11**. Secondly, a breakable zone **17** of the outer portion **9** leads either to a breakable zone **20***a* of the inner portion **10**, or to a cut **20***b* therein, or to a gap **20***c* therein.

In this way, on unscrewing the cap **1**, the tamper-proofing ring **8** remains associated with the closing portion **3**.

The terms upstream and downstream as used herein refer to the cap unscrewing direction.

The terms axial and transverse refer to the axis **21** of the cap.

The expression "breakable zone" is used to designate a zone in which the plastics material can be broken by a large enough force being applied to it. Such a breakable zone may include a thin region of the plastics material. Such a thin region may be constituted by a recess such as a groove. Such a groove may be provided in the outside face (FIG. **10**A), in the inside face (FIG. **10**B), or both in the outside face and in the inside face (FIG. **10**C) of the outer portion **9** or of the inner portion **10**.

The term "cut" is used to designate a zone in which the continuity of the plastics material is broken without a significant empty space. A typical case of such a break is a slit without any material being removed.

The term "gap" is used to designate a zone in which there is a break in the continuity of the plastics material with an empty space **20***d*.

FIGS. **11**A, **11**B, and **11**C show the three corresponding embodiments for the inner portion **10**. A breakable zone **20***a* is shown in FIG. **11**A. A cut **20***b* is shown in FIG. **11**B. A gap **20***c* with its empty space **20***d* is shown in FIG. **11**C. In the embodiments considered, a breakable zone **17** of the outer portion **9** extends in a generally inclined direction relative to the axis **21** of the cap. This direction is inclined in the opposite direction to the thread **6**, as shown clearly in FIGS. **1** to **3**. A breakable zone **20***a* or a cut **20***b* in the inner portion **10** extends in a generally inclined direction relative to the axis **21** of the cap **1**.

In a first embodiment, this direction is inclined in the same direction as the thread **6** (see FIG. **17**A). This embodiment corresponds to the case in which, while the cap is being manufactured, and when the inner portion **10** extends the outer portion **9**, the breakable zone **20***a* or the cut **20***b* itself extends the breakable portion **17**.

In a second embodiment, the direction of the breakable zone **20***a* or of the cut **20***b* is the same as that of the

breakable zone **17**, i.e. it is inclined in the opposite direction to the thread **6**. This situation occurs when, during cap manufacture, the breakable zone **20***a* or the cut **20***b* extends in a direction substantially symmetrical to the direction of the breakable zone **17** about a transverse plane including the edges **14**, **15**.

The general direction of the inclination of the breakable zone **17**, **20***a*, or of the cut **20***b* forms an angle lying in the range 30° to 80° with the axis **21**. Preferably, the angle is equal to or in the vicinity of 45°.

Preferably, the angle of inclination of the breakable zone **17** is the same as the angle of inclination of the breakable zone **20***a* or of the cut **20***b*.

A breakable zone **17** extends from edge **12** to the opposite edge **15**. A breakable zone **20***a*, a cut **20***b*, or a gap **20***c* extends from the thin edge **14** to the free edge **22** of the inner portion **10**.

A breakable zone **17**, **20***a* or a cut **20***b* extends essentially along a rectilinear direction.

In the embodiment shown in FIG. **12**, the breakable zone **17** leads to the empty space **18** substantially orthogonally to the axis **21**. Therefore, the breakable zone **17** substantially extends the empty space **18**, thereby facilitating breaking the breakable zone **17**.

In this embodiment, and when the breakable zone **17** extends essentially along a rectilinear direction that is inclined relative to the axis **21**, the breakable zone **17** ends in curved segment **23** in the vicinity of edge **12**.

In the embodiment shown in FIG. **13**, a breakable zone **17** in the outer portion **9** has a segment **24** that is orthogonal to the axis **21** of the cap. The orthogonal segment **24** is interposed between two inclined segments **24***a*, **24***b* that are inclined relative to the axis **21**. This disposition enables forces to be transmitted in the direction of the axis **21**.

In another embodiment (not shown), the breakable zone **17** includes a plurality of segments **24**.

A non-breakable fastening **19** is immediately adjacent to the end portion of a breakable zone **17** of the outer portion **9**, which breakable zone leads to the free edge **12** thereof. On unscrewing the cap **1**, the empty space **18** tends to be widened. When a non-breakable fastening **19** which cannot be broken by merely unscrewing the cap **1** is reached, the axial forces are applied immediately to the breakable zone **17** because that zone adjoins the non-breakable fastening **19**. The non-breakable fastening **19** contributes to transferring the breaking forces from the cap **1** to the breakable zone **17**.

Although a non-breakable fastening **19** is not broken on unscrewing the cap **1**, it may be such that it is not strong enough to withstand being broken by a sufficient traction force being exerted by the user after the cap has been unscrewed.

In this embodiment, once it has been removed, the cap includes the tamper-proofing ring **8** adjoining the closing portion. The user can then separate the tamper-proofing ring **8** from the closing portion **3**. Not only is the neck of the container then free of the ring **8**, but the ring **8** is removed from the closing portion **3**.

A gap **20***c* in the inner portion **10** is constituted by the empty space **20***d* and extends circumferentially about the axis **21**. The empty space extends over an arc lying in the range 20° to 100°, and preferably in the range 30° to 90°. The arc has an angle corresponding substantially to that of the facing non-breakable fastening **19**. In the embodiment shown in FIG. **7**, the two edges delimiting a gap **20***c* in the inner portion **10** are disposed in planes that are substantially axial planes of the cap **1**. In the variant embodiment shown in FIG. **2**, the edges are placed such that they diverge from the thin edge **14** to the free edge **22**.

The edges delimiting a gap **20***c* in the inner portion **10** are inclined at an angle equal to or in the vicinity of 45° to the axis **21** of the cap **1**.

The outer portion **9** is of substantially constant thickness over its entire periphery, and over its entire axial height except in the breakable zone(s) **17** with which it is provided. Its thickness is not more than substantially equal to, or optionally less than, the thickness of the skirt **5**. The skirt is preferably provided with axial fluting so as to improve the grip of the closing portion **3** in the fingers of the user, and so as to prevent the closing portion from slipping relative to said fingers.

In the embodiment shown in FIGS. **1**, **4**, and **6**, the inner portion **10** extends over an axial height that is not greater than the axial height of the outer portion **9**. The outer portion **9** then entirely covers the inner portion **10**. In particular, the inner portion **10** extends over about half of the axial height of the outer portion **9** (see FIG. **4**).

In another variant embodiment (FIG. **14**), the inner portion **10** extends over an axial height that is greater than the axial height of the outer portion **9**. The outer portion **9** then covers the inner portion **10** in part only, the inner portion then partially overlapping the skirt **5** in the vicinity of the free edge **13** thereof.

In the embodiments shown, the right axial section of the inner portion **10** is generally triangular or trapezium-shaped with a vertex defined by the thin edge **14**, and an opposite base defined by the thick free edge **22**. The thickness of the inner portion **10** then increases uniformly from edge **14** to the opposite free edge **22**.

In a first embodiment of the invention, the link means **11** are constituted by the non-breakable fastenings **19** only. At least two breakable zones **17** are then provided in the outer portion **9**, and two breakable zones **20***a* are provided in the inner portion **10**. In this way, the inner portion **10** is provided with breakable zones **20***a* rather than with cuts **20***b* or with gaps **20***c* so that the inner portion **10** constitutes a closed annular loop contributing to the strength of the outer portion **9**.

In another embodiment of the invention, the link means **11** are constituted both by the non-breakable fastenings **19**, and also by breakable bridges **26** which are spaced apart from one another circumferentially, and which are broken on unscrewing the cap.

The variants shown in FIGS. **1** to **8** correspond to the link means **11** comprising both non-breakable fastenings **19** and also breakable bridges **26**. The variant shown in FIG. **9** corresponds to the link means **11** comprising non-breakable fastenings **19** only, no breakable bridge, such as **26**, then being provided.

Reference is made more specifically below to FIGS. **5** and **15**.

The right cross-section of a breakable bridge **26** is generally triangular with a base adjoining the inside face of the skirt **5** and the inside face of the outer portion **9**, and an opposite vertex facing outwards. The bridge is disposed such that the cap can be removed from the mold. The vertex of the breakable bridge **26** is disposed slightly set back from the outside face of the skirt **5**, and from the outside face of the outer portion **9**. In axial elevation, a breakable bridge **26** is generally triangular or trapezium-shaped with a large end adjoining the outer portion **9** and a vertex or a small end adjoining the skirt **5**.

In a possible embodiment, a breakable bridge **26** extends in a generally inclined direction relative to the axis of the cap (see the breakable bridge shown on the right of FIG. **15**). This general direction is inclined in the same direction as the thread **6**.

When the cap of the invention is provided with breakable bridges **26**, it has as small a number of bridges as possible. The minimum number is about four, five or six.

A non-breakable fastening **19** is distant from the breakable bridge **26** situated towards the upstream end of an arc lying in the range 45° to 90°.

A non-breakable fastening **19** may also be used to constrain the ring **8** to rotate with the closing portion **3**.

In accordance with another characteristic, the cap is also provided with at least one axial abutment in the form of a projection on the skirt **5** and/or on the outer portion **10**, such a projection extending the skirt from its free edge **13** towards the outer portion and/or extending the outer portion from its free edge **12** towards the skirt. Such a projection is situated in the empty space **18**. It prevents the empty space **18** from being closed when the cap **1** is installed on the container **2**. Such an abutment **27** extends circumferentially over an arc having an angle that is less than about 40°. Two adjacent abutments are separated from each other by at least one breakable bridge **26** or by a non-breakable fastening **19**. Two adjacent abutments **27** are separated from each other by at least four breakable bridges **26**. A non-breakable fastening **19** is separated from the first breakable bridge **26** by an abutment **27**. The radial thickness of an abutment **27** adjoining the skirt **5** is substantially equal to the radial thickness of the skirt **5** and the abutment has two rounded axial edges (see FIG. **5**). Abutments **27** occupy approximately in the range one third to one half of the circumference of the empty space **18**. Various types of abutment are shown in FIG. **16**. The first abutment from the left extends the skirt **5**. The second abutment extends the outer portion **9**. The third abutment is formed by an extension to the skirt **5** and by an extension to the outer portion **9**. The fourth and last abutment is of the same type as the preceding abutment, with each of the two portions overlapping the other so as to constrain the outer portion to rotate with the skirt. A non-breakable fastening **19** is situated substantially diametrically opposite to another non-breakable fastening **19** or to a breakable bridge **26**.

Reference is made below to FIGS. **1**, **4**, **6**, and **18** showing an inner portion **10** that is inclined relative to the outer portion **9** at an angle of approximately in the range 10° to 60°, more specifically approximately in the range 20° to 40°, and in particular equal to or in the vicinity of 30°. The angle is such that unscrewing the cap **1** causes the inner portion **10** to pivot about its thin edge **14** away from the outer portion. The inner portion **10** has a free edge **22** that is radially spaced apart from the outer portion **9** or from the skirt **5**.

When the cap **1** is installed on the container, the inner portion **10** is disposed on the cap **1** substantially as it was prior to installation, once the inner portion **10** has been pivoted so that it projects back inside the ring **8**. The clearance between the inner portion **10** and the outer portion **9** or the skirt **5** makes it possible to take up any dimensional differences relating to the tolerances, in particular on the container **2**. Taking up such play is facilitated by the inner portion abutting against the projection **16** inwardly, i.e. towards the axis **21**, and not outwardly towards the outer portion **9**.

Reference is made more specifically below to FIGS. **1** to **3** showing a first variant embodiment.

In this variant, the cap **1** is provided with a single non-breakable fastening **19** and a single gap **20***c* in the inner portion **10**. In other embodiments of the same variant, the gap **20***c* may be replaced with a breakable zone **20***a* or with a cut **20***b*. In the example shown in the drawings, four breakable bridges **26** are distributed substantially uniformly over one half of the periphery of the cap **1** opposite from the breakable zone **17** of the outer portion **9** and opposite from the gap **20***c* in the inner portion **10**. Furthermore, three abutments **27** are provided, two of which are substantially diametrically opposite each other, the third abutment being diametrically opposite from the non-breakable fastening **19**. In this way, going upstream from the breakable zone **17**, the following are encountered in succession: a first abutment **27**, a first breakable bridge **26** followed by a second breakable bridge **26**, a second abutment **27**, a third bridge **26**, a third abutment **27**, a third and last abutment **27**, a fourth and last bridge **26**, and three non-breakable fastenings **19**. In this embodiment, the inner portion **10** is in the form of an annular loop which is either open or closed, but which is made in one piece.

Reference is made more specifically below to FIGS. **4** and **5** which show a second variant embodiment.

In the second variant, two non-breakable fastenings **19** are provided substantially diametrically opposite each another, and two gaps **20***c* in the inner portion are provided also substantially diametrically opposite each other. As above, gaps **20***c* may be replaced with breakable zones **20***a* or with cuts **20***b*.

In this variant, there are six breakable bridges **26** that are substantially diametrically opposite one another, and that are situated in the middle of the outer portion **9**. In addition, four abutments **27** are provided opposite to one another in pairs, and separated from one another either by breakable bridges **26** or by non-breakable fastenings **19**. In this way, going upstream about the axis **21** from a breakable zone **17**, the following are encountered in succession: a first abutment **27**, a first breakable bridge **26** followed by a second breakable bridge **26** followed by a third breakable bridge **26**, a second abutment **27**, a non-breakable fastening **19**, a breakable zone **17**, a third abutment **27**, a fourth breakable bridge **26** followed by a fifth breakable bridge **26** followed by a sixth breakable bridge **26**, a fourth and last abutment **27**, and the second non-breakable fastening **19**.

Reference is made more specifically below to FIGS. **6**, **7**, and **8** showing a third variant embodiment.

In this variant, three non-breakable fastenings **19** are disposed at substantially 120° from one another, and three gaps **20***c* in the inner portion **10** are also disposed at substantially 120° from one another. In this embodiment, there are six breakable bridges **26** which are disposed at substantially 120° from one another, which are situated substantially in the middles of the inner portion segments **10** separated by the gaps, and which are diametrically opposite from the non-breakable fastenings **19**. Six abutments **27** are also provided at substantially 120° from one another. Going upstream about the axis **21** from a first breakable zone **17**, the following are encountered in succession: a first abutment **27**, a first breakable bridge **26** followed by a second breakable bridge **26**, a second abutment **27**, a non-breakable fastening **19**, a second breakable zone **17**, a fourth abutment **27**, a third breakable bridge **26** followed by a fourth breakable bridge **26**, a fourth abutment **27**, a non-breakable fastening **19**, the third and last breakable zone **17**, a fifth breakable bridge **26** followed by a sixth and last breakable bridge **26**, a sixth and last abutment **27**, and a third non-breakable fastening **19**.

Reference is made more specifically below to FIG. **9** which shows a fourth variant embodiment. In this variant embodiment, four non-breakable fastenings **19** are provided spaced apart from one another by substantially one fourth of a turn. In the variant shown in the drawing, the non-breakable fastenings **19** alone constitute the link means **11**, the cap **1** having no breakable bridges **26**. The inner portion **10** then includes four breakable zones **20***a* spaced apart from one another by substantially one fourth of a turn.

In an embodiment that is not shown, four breakable bridges **26** and four breakable zones **20***a*, cuts **20***b*, or gaps **20***c* in the inner portion **10** are provided spaced apart from one another by substantially one fourth of a turn.

In a method of manufacturing a cap such as described above, firstly it is made by injection with the inner portion **10** extending the outer portion **9**. Then the inner portion **10** is pivoted about its thin edge **14** so as to project back inside the ring **8**.

In accordance with the invention, the inner portion **10** is delimited by the free edge **22** lying in one or more planes P that may be inclined relative to a reference plane R which is orthogonal to the axis of the cap.

For example, plane R is the plane defined by the edge **15** of the outer portion **9**.

In a fifth and sixth embodiment, the free edge **22** lies substantially entirely in the same plane (see FIGS. **19** and **20**). In a seventh variant, the free edge **22** lies in a plurality of planes P (see FIG. **21**). In which case, the inner portion **10** may be provided with some number of indentations that are of greater or lesser size. In the fifth variant shown in FIG. **19**, the plane P is inclined in the same direction as the thread **6** of the cap, and in the sixth variant shown in FIG. **20**, the plane P is inclined in the opposite direction to the thread **6** of the cap.

Plane P is inclined relative to plane R at an angle lying approximately in the range 0° to 10°, and preferably approximately in the range 3° to 4°.

In accordance with the invention (FIGS. **20** and **21**), the breakable zone **17** is situated facing or nearly facing a location of the inner portion **10** where the inner portion is of greatest axial extent. This location corresponds to a "high point" **30** of the free edge **22**, which high point is the point furthest from the edges **14** and **15**, and closest to the transverse end wall **4**.

In the most general case, the free edge **22** also has a "low point" **31** which is the point closest to the edges **14** and **15**, and furthest from the wall **4**.

If the high point **30** is preferably close to a breakable zone **17**, conversely a breakable zone **20***a*, a cut **20***b*, or a gap **20***c* in the inner portion **10** is situated facing or nearly facing a location of the inner portion **10** where the inner portion is of least axial extent, i.e. facing or in the vicinity of the low point **31**.

Plane P may have three different positions relative to the transverse reference plane **R1** defined by the edge **15**:

either plane P intersects plane **R1** along a line that is substantially tangential to the outer portion **9** (FIG. **22**), in which case a gap **20***c* is defined at the low point **31**;

or plane P intersects plane **R1** inside the cap, i.e. along a line that intersects the outer portion (FIG. **22***b*); this enables a gap **20***c*, a cut **20***b*, or a breakable zone **20***a* to be defined at the low point **31**;

or else plane P intersects plane **R1** outside the outer portion **9** (FIG. **22***c*); this defines a gap **20***c* in the inner portion **10** at the low point **31**.

In another embodiment, a portion of the inner portion **10** extends axially beyond the outer portion, and a portion of the inner portion does not extend beyond the outer portion (FIG. **22***d*).

In a method of manufacturing a cap such as described above, firstly it is made by injection with the inner portion **10** extending the outer portion **9**. Then the inner portion **10** is pivoted about its thin edge **14** so as to project back inside the ring **8**.

Once the inner portion **10** projects back inside the ring **8**, the cap **1** can be screwed on the container **2**.

Naturally, although only certain embodiments of the invention have been described, any modification made in the same spirit by a person skilled in the art remain within the ambit of the present invention. For example, any mutual combination of the different variants described remain within the ambit of the invention. In particular, the individual dispositions of the link means described in variants one to four are combinable with any one of variants five to seven relating to the inclination of the free edge.

We claim:

1. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the can (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the at least one breakable zone (**17**) in the outer portion (**9**) curves away from the empty space (**18**) between the outer portion (**9**) and the skirt (**5**) so that it substantially extends the empty space (**18**).

2. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the second end termination of the breakable zone on the outer portion is one of a breakable zone (**20***a*) and a cut (**20***b*) in the inner portion (**10**) which extends in a generally inclined direction relative to a rotational axis (**21**) of the cap (**1**);

wherein the at least one breakable zone (**17**) in the outer portion (**9**) has at least one segment (**24**) that is orthogonal to the axis (**21**) of the cap (**1**) and that is interposed between two segments (**24***a*, **24***b*) that are inclined relative to the axis.

3. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be

opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the second end termination of the breakable zone on the outer portion is the 30°–90° gap (**20***c*) in the inner portion (**10**), constituted by an empty space (**20***d*) that extends circumferentially in said inner portion (**10**).

4. A cap according to claim **3**, wherein the empty space (**20***d*) extends over an arc of angle substantially corresponding to an angle through which a facing non-breakable fastening (**19**) extends.

5. A cap according to claim **3**, wherein two edges delimiting the gap (**20***c*) in the inner portion (**10**) are disposed to be one of substantially in axial planes of the cap (**1**), and divergent from the thin edge (**14**) of the inner portion (**10**) to a free edge (**22**) of the inner portion.

6. A cap according to claim **5**, wherein the edges delimiting the gap (**20***c*) in the inner portion (**10**) are inclined relative to the axis (**21**) of the cap (**1**) at an angle of approximately 45°.

7. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the inner portion (**10**) extends over an axial height which is not more than the axial height of the outer portion (**9**);

wherein the inner portion (**10**) extends over about one half of the axial height of the outer portion (**9**).

8. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the inner portion (**10**) extends over an axial height that is greater than the axial height of the outer portion (**9**) which covers the inner portion (**10**) in part only, with the inner portion partially overlapping the skirt (**5**).

9. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**) and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing-portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the link means (**11**) are constituted by the non-breakable fastenings (**19**) only;

wherein there are at least two breakable zones (**17**, **20***a*) in the outer portion (**9**) and in the inner portion (**10**).

10. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the link means (**11**) are constituted both by the non-breakable fastenings (**19**) and also by breakable bridges (**26**) that are spaced apart circumferentially, and that are broken on unscrewing the cap (**1**);

wherein a right cross-section of the breakable bridges (**26**) is generally triangular with a base adjoining an inside face of the skirt (**5**), and an inside face of the outer portion (**9**), and an opposite vertex facing outwards.

11. A cap according to claim 10, wherein the vertex is disposed slightly set back from an outside face of the skirt (5) and from an outside face of the outer portion (9).

12. A screw cap made of a plastics material, the cap comprising:

a closing portion (3) having:

a transverse end wall (4); and

a skirt (5) adjoining the wall (4) and provided with an inside thread (6); and

a tamper-proofing ring (8) formed integrally with the closing portion (3), and having:

an outer portion (9) forming a closed loop, disposed in alignment with the skirt (5), and connected thereto via link means (11) spaced apart circumferentially between a free edge (12) of the outer portion (9) and a free edge (13) of the skirt (5), a lower edge (15) of the outer portion directly adjoining:

a thin edge (14) of an inner portion (10) that can be pivoted about the thin edge relative to the outer portion (9), the inner portion (10) being designed to project back inside the ring (8) towards the transverse end wall (4) such that the inner portion is positioned to interfere with a projection (16) on a container (2) on which the cap (1) is meant to be screwed;

at least one breakable zone (17) on the outer portion (9) of said tamper-proofing ring (8) enabling it to be opened on unscrewing the cap (1) terminating at a first end on an empty space (18) between the outer portion (9) and the skirt (5), which empty space (18) is delimited downstream, with respect to the unscrewing direction of the cap (1), by at least one non-breakable fastening (19) which does not break on unscrewing the cap (1), and which is part of said link means (11), and terminating at a second end on one of a breakable zone (20*a*), a cut (20*b*), and a gap spanning 30°–90° of a circumference of the inner portion, (20*c*) disposed on the inner portion (10) so that, on unscrewing the cap (1), the tamper-proofing ring (8) remains attached to the closing portion (3);

further comprising at least one axial abutment (27) formed as at least one of a projection on the skirt (5) and a projection on the outer portion (9), being situated in the empty space (18) provided between the skirt and the outer portion, if disposed on the skirt extending the skirt from its free edge (13) towards the outer portion (9), if disposed on the outer portion extending the outer portion from its free edge (12) towards the skirt (5);

wherein two adjacent abutments (27) are separated from each other by not more than four breakable bridges (26).

13. A screw cap made of a plastics material, the cap comprising:

a closing portion (3) having:

a transverse end wall (4); and

a skirt (5) adjoining the wall (4) and provided with an inside thread (6); and

a tamper-proofing ring (8) formed integrally with the closing portion (3), and having:

an outer portion (9) forming a closed loop, disposed in alignment with the skirt (5), and connected thereto via link means (11) spaced apart circumferentially between a free edge (12) of the outer portion (9) and a free edge (13) of the skirt (5), a lower edge (15) of the outer portion directly adjoining:

a thin edge (14) of an inner portion (10) that can be pivoted about the thin edge relative to the outer portion (9), the inner portion (10) being designed to project back inside the ring (8) towards the transverse end wall (4) such that the inner portion is positioned to interfere with a projection (16) on a container (2) on which the cap (1) is meant to be screwed;

at least one breakable zone (17) on the outer portion (9) of said tamper-proofing ring (8) enabling it to be opened on unscrewing the cap (1) terminating at a first end on an empty space (18) between the outer portion (9) and the skirt (5), which empty space (18) is delimited downstream, with respect to the unscrewing direction of the cap (1), by at least one non-breakable fastening (19) which does not break on unscrewing the cap (1), and which is part of said link means (11), and terminating at a second end on one of a breakable zone (20*a*), a cut (20*b*), and a gap spanning 30°–90° of a circumference of the inner portion, (20*c*) disposed on the inner portion (10) so that, on unscrewing the cap (1), the tamper-proofing ring (8) remains attached to the closing portion (3);

wherein the link means (11) are constituted both by the non-breakable fastenings (19) and also by breakable bridges (26) that are spaced apart circumferentially, and that are broken on unscrewing the cap (1);

wherein one of the at least one non-breakable fastenings (19) is spaced apart from a first of the breakable bridges (26) situated upstream relative to the unscrewing direction of the cap (1) by an arc lying approximately in the range 45° to 90°;

wherein one of the at least one non-breakable fastenings (19) is spaced apart from the first breakable bridge (26) situated upstream relative to the unscrewing direction of the cap (1) by an abutment (27).

14. A screw cap made of a plastics material, the cap comprising:

a closing portion (3) having:

a transverse end wall (4); and

a skirt (5) adjoining the wall (4) and provided with an inside thread (6); and

a tamper-proofing ring (8) formed integrally with the closing portion (3), and having:

an outer portion (9) forming a closed loop, disposed in alignment with the skirt (5), and connected thereto via link means (11) spaced apart circumferentially between a free edge (12) of the outer portion (9) and a free edge (13) of the skirt (5), a lower edge (15) of the outer portion directly adjoining:

a thin edge (14) of an inner portion (10) that can be pivoted about the thin edge relative to the outer portion (9), the inner portion (10) being designed to project back inside the ring (8) towards the transverse end wall (4) such that the inner portion is positioned to interfere with a projection (16) on a container (2) on which the cap (1) is meant to be screwed;

at least one breakable zone (17) on the outer portion (9) of said tamper-proofing ring (8) enabling it to be opened on unscrewing the cap (1) terminating at a first end on an empty space (18) between the outer portion (9) and the skirt (5), which empty space (18) is delimited downstream, with respect to the unscrewing direction of the cap (1), by at least one non-breakable fastening (19) which does not break on unscrewing the cap (1), and which is part of said link means (11), and terminating at a second end on

one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

further comprising at least one axial abutment (**27**) formed as at least one of a projection on the skirt (**5**) and a projection on the outer portion (**9**), being situated in the empty space (**18**) provided between the skirt and the outer portion, if disposed on the skirt extending the skirt from its free edge (**13**) towards the outer portion (**9**), if disposed on the outer portion extending the outer portion from its free edge (**12**) towards the skirt (**5**);

wherein one of the at least one axial abutments (**27**) adjoins the skirt (**5**), the abutment having rounded edges, and a radial thickness that is substantially equal to a radial thickness of the skirt (**5**).

15. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**) ; and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a protection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the can (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

further comprising at least one axial abutment (**27**) formed as at least one of a projection on the skirt (**5**) and a projection on the outer portion (**9**), being situated in the empty space (**18**) provided between the skirt and the outer portion, if disposed on the skirt extending the skirt from its free edge (**13**) towards the outer portion (**9**), if disposed on the outer portion extending the outer portion from its free edge (**12**) towards the skirt (**5**);

wherein the at least one axial abutment comprises at least two abutments (**27**) which occupy approximately in the range one third to one half of a circumference of the empty space (**8**) between the skirt and the outer portion (**9**).

16. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the can (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the link means (**11**) are constituted both by the non-breakable fastenings (**19**) and also by breakable bridges (**26**) that are spaced apart circumferentially, and that are broken on unscrewing the cap (**1**);

wherein one of the at least one non-breakable fastenings (**19**) is situated substantially diametrically opposite from one of another of the non-breakable fastenings (**19**) and one of the breakable bridges (**26**).

17. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the link means (**11**) are constituted both by the non-breakable fastenings (**19**) and also by breakable bridges (**26**) that are spaced apart circumferentially, and that are broken on unscrewing the cap (**1**);

further comprising four breakable bridges (**26**) substantially uniformly distributed over one half of a periphery of the cap (**1**) opposite from a single breakable zone (**17**) of the outer portion (**9**), and from one of the breakable zone (**20***a*), cut (**20***b*), and gap (**20***c*) in the inner portion (**10**).

18. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the link means (**11**) are constituted both by the non-breakable fastenings (**19**) and also by breakable bridges (**26**) that are spaced apart circumferentially, and that are broken on unscrewing the cap (**1**);

further comprising three abutments (**27**), two of which are diametrically opposite each other, the third abutment being diametrically opposite the non-breakable fastening (**19**).

19. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

further comprising two substantially diametrically opposite non-breakable fastenings (**19**), and two substantially diametrically opposite inner portion regions comprising one of breakable zones (**20***a*), cuts (**20***b*), and gaps (**20***c*).

20. A cap according to claim **19**, further comprising six breakable bridges (**26**) arranged in diametrically opposite pairs and that are situated midway of segments of the inner portion (**10**) that are separated by the diametrically opposite inner portion regions.

21. A cap according to claim **19**, further comprising four abutments (**27**) arranged in opposite pairs, and separated from one another either by one of the breakable bridges (**26**) and the non-breakable fastenings (**19**).

22. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially

between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

further comprising three non-breakable fastenings (**19**) disposed at substantially 120° from one another, and three inner portion regions comprising one of breakable zones (**20***a*), cuts (**20***b*), and gaps (**20***c*) also disposed at substantially 120° from one another.

23. A cap according to claim **22**, further comprising six breakable bridges (**26**) disposed at substantially 60° from one another, situated substantially in a middle of the inner portion (**10**), and diametrically opposite the non-breakable fastenings (**19**).

24. A cap according to claim **22**, further comprising six abutments (**27**) disposed at substantially 60° from one another.

25. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein there are four non-breakable fastenings (**19**) spaced apart from one another by substantially one fourth of a turn.

26. A cap according to claim **25**, wherein there are four breakable bridges (**26**) and four inner portion regions comprising one of breakable zones (**20***a*), cuts (**20***b*) and gaps (**20***c*) that are spaced apart from one another by substantially one fourth of a turn.

27. A cap according to claim **25**, wherein the non-breakable fastenings (**19**) are the only link members (**11**), and wherein there are four breakable zones (**20***a*) in the inner portion (**10**) spaced apart from one another by substantially one fourth of a turn.

28. A screw cap made of a plastics material, the cap comprising:

a closing portion (**3**) having:

a transverse end wall (**4**); and

a skirt (**5**) adjoining the wall (**4**) and provided with an inside thread (**6**); and

a tamper-proofing ring (**8**) formed integrally with the closing portion (**3**), and having:

an outer portion (**9**) forming a closed loop, disposed in alignment with the skirt (**5**), and connected thereto via link means (**11**) spaced apart circumferentially between a free edge (**12**) of the outer portion (**9**) and a free edge (**13**) of the skirt (**5**), a lower edge (**15**) of the outer portion directly adjoining:

a thin edge (**14**) of an inner portion (**10**) that can be pivoted about the thin edge relative to the outer portion (**9**), the inner portion (**10**) being designed to project back inside the ring (**8**) towards the transverse end wall (**4**) such that the inner portion is Positioned to interfere with a projection (**16**) on a container (**2**) on which the cap (**1**) is meant to be screwed;

at least one breakable zone (**17**) on the outer portion (**9**) of said tamper-proofing ring (**8**) enabling it to be opened on unscrewing the cap (**1**) terminating at a first end on an empty space (**18**) between the outer portion (**9**) and the skirt (**5**), which empty space (**18**) is delimited downstream, with respect to the unscrewing direction of the cap (**1**), by at least one non-breakable fastening (**19**) which does not break on unscrewing the cap (**1**), and which is part of said link means (**11**), and terminating at a second end on one of a breakable zone (**20***a*), a cut (**20***b*), and a gap spanning 30°–90° of a circumference of the inner portion, (**20***c*) disposed on the inner portion (**10**) so that, on unscrewing the cap (**1**), the tamper-proofing ring (**8**) remains attached to the closing portion (**3**);

wherein the inner portion (**10**) is delimited by a free edge (**22**) lying in at least one plane P that is inclined relative to a reference plane R which is orthogonal to the axis (**21**) of the cap.

29. A cap according to claim **28**, wherein the free edge (**22**) lies in a plurality of planes P.

30. A cap according to claim **28**, wherein a plane P is inclined relative to plane R at an angle lying approximately in the range 3° to 4°.

31. A cap according to claim 28, wherein the free edge (22) lies substantially entirely in a single plane P.

32. A cap according to claim 31, wherein one of the at least one breakable zones (17) is situated facing or nearly facing a location of the inner portion (10) where the inner portion is of greatest axial extent.

33. A cap according to claim 28, wherein one of a breakable zone 20*a*, a cut 20*b*, and a gap 20*c* in the inner

portion 10 is situated facing a location of the inner portion (10) where the inner portion is of least axial extent.

34. A cap according to claim 33, wherein a plane P intersects a transverse plane R1 of an edge of the skirt (15) along a line that is one of substantially tangential to the outer portion (9), intersects the outer portion (9), and lies outside the outer portion (9).

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